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REPORT

OF THE

MARLBOROUGH COLLEGE

Natural History Society,

FOR THE

HALF-YEAR,

ENDING MIDSUMMER, 1866.

"Tum mihi Naturæ libeat perdiscere mores,
Quis Deus hanc mundi temperet arte domum."

MARLBOROUGH:
Printed and Published by C. Perkins, Times Office.
1866.

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PREFACE.

In several respects the half-year just past has been one of the most important passages in our Society's history. We are able to report a great deal of work done, more in progress, or in prospect; and we were never so fully justified as we are at present in regarding the Marlborough Natural History Society as a regularly established institution of the School.

Early in the half-year, certain subscriptions were sent unasked to the President, and these led to the distribution of a circular, intended to explain the origin and aims of the Society, among members of the Council and friends of the School. It may fairly be hoped that this circular, issued under the Master's direct sanction, may have contributed a good deal to strengthen our position.

The great feature of the half-year has been the formation for the first time of Sections devoted to special subjects. Sections now exist for the particular study of Botany, Geology, Entomology, Ornithology, and Archæology. Two of the heads of sections have been necessarily absent for longer or shorter periods of time; but in spite of this drawback it may be said that a thoroughly satisfactory start has been made, and that the right principle has been adopted for securing the soundest and most permanent methods of working.

Archæology, it will be noticed, is quite a new branch of operation—a generic addition to our objects. Its study was adopted after a good deal of deliberation: and there is every reason for hoping that, while displacing none of the original interests, it will develope new life among many of our members.

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The Herbarium has received many and important additions; the first steps have been taken towards the formation of a library, and the cabinets for eggs and lepidoptera have been well started. A measure has for some time been in contemplation, and is now actually to be carried out, by means of which all the collections will be rendered more practically useful, as being more easily accessible. This is no less than the conversion of what is now known as the Middle Fifth Class Room into a Class Room for the Society's purposes. The central position of this room, and the careful manner in which it will be fitted up, will render this change a decided step in advance, and one which all members and friends of the Society will rejoice to see carried out.

October next will witness a critical epoch in our progress. Several old and tried friends of the Society will be leaving the School, and great care and energy will be required in getting their places fitly supplied. We cannot but hope, however, that with our present position and prospects the right spirit will be shown among rising members; and that there will be no want of activity and enterprise as each outgoing officer says in turn to his successor—

"Cursu tibi lampada trado."

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LIST OF MEMBERS.

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REV. T. A. PRESTON.

COMMITTEE.

A. C. ALMACK. G. K. MILLS.
W. W. DAYMAN. F. C. LIGHTFOOT.
R. F. ISAACSON.

SECRETARY.

W. W. DAYMAN.

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W. W. DAYMAN. A. C. ALMACK.
W. R. CARLES.

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FORMER MEMBERS.

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T. W. JONES. J. W. V. TAYLOR.
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H. A. WILLIAMS. W. W. MELVILLE.
J. W. WHITAKER. J. POLE.
A. C. D. RYDER. R. H. BROWN.
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P. S. ROBINSON. J. W. HARRISON.
R. H. TYACKE. H. A. EVANS.

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REPORTS.

MIDSUMMER, 1865.

No. in hand	9	Bound for Society	1
		Sold	3
		In hand	5
	9		9

CHRISTMAS, 1865.

No. printed	400	Supplied to Members	25
		Given away	14
		Sold	216
		In hand	145
	400		400

In addition to the donations of money enumerated in the accounts, the following donations have been received by the Society, and are hereby gratefully acknowledged:—

A minute book	by Rev. F. W. Farrar.
A pocket microscope	by R. G. Clarke, Esq.
"Recreative Science," 3 vols. The "Intellectual Observer," complete "Popular Science Review," complete...	by Rev. J. M. Fuller.
The "Geologist," 6 vols. Geological Magazine, from its commencement	by Rev. T. Cornthwaite.

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ACCOUNTS.

RECEIPTS.

Balance in hand				£3	8	0
Subscriptions				3	8	0
Donations:						
Right Hon. T. H. S. Sotheron Estcourt	£5	0	0			
Rev. H. Bell	0	11	0			
C. Hodgson, Esq.	1	0	0			
Mrs. Norris, Epsom	1	1	0			
R. Hunter, Esq.	1	0	0			
E. Marjoribanks, Esq.	5	0	0			
Rev. H. Latham	2	0	0			
Miss Corrie	1	0	0			
W. E. Mullins, Esq.	1	0	0			
C. M. Bull, Esq.	0	10	0			
				18	2	0
By sale of Report				10	19	0
				£35	17	0

PAYMENTS.

Printing 400 copies of Report	£14	12	6
Printing Labels and Circular	1	2	6
Contributions towards tea (10 meetings)	5	0	0
Books for Catalogue, &c., of Library	0	19	0
Balance in hand	14	3	0
	£35	17	0

With this balance of £14 3s. it is proposed to purchase a few books for the Library, and to liquidate in part the debt upon the cabinets, now amounting to £29, towards which only £1 12s. 6d. has yet been subscribed.

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MEETING HELD FEBRUARY 16, 1866.

The Society passed a vote of thanks to the Rev. F. W. Farrar for the present of a Minute-book.

EXHIBITIONS :—

BY THE PRESIDENT.—Fluor Spar, with a cavity partially filled with water of crystallization, presented to the College by the Rev. J. Sowerby. Fossils from Sevenoaks Tunnel, and from a well at Epsom, presented by Mrs. Norris. Truffles (*Tuber Æstivum*).

BY A. C. ALMACK.—Jew's-ear Fungus (*Auricula Herneola-Judæ*) very rare. Water-rail, shot in the water-meadows, from Mr. Brind, Marlborough. Egg of Ortolan Bunting (*E. Hortulana*).

BY J. POLE.—Gum Copal, containing insects. It is the product of a tree, and is conjectured to be several hundred years old.

BY F. C. LIGHTFOOT.—Specimens of Jersey and English Lepidoptera, including a species of Tiger, allied to the Garden Tiger (*A. Caja*), Clouded Yellow (*C. Edusa*), *P. Bæticus*, &c.

F. E. THOMPSON, Esq., kindly offered for study a series of 200 specimens of Rocks.

W. W. DAYMAN was then elected to serve as Secretary in the place of A. C. ALMACK, who resigned.

A vote of thanks to A. C. ALMACK was carried unanimously.

MEETING HELD MARCH 2nd, 1866.

EXHIBITIONS :—

BY THE PRESIDENT.—A mass of Fir-leaves, felted together by the action of water, from the neighbourhood of Shrewsbury.

BY A. HERKLOTS.—A collection of Eggs from Scotland, including specimens of those of the Eared Grebe, Crested Grebe, Kite, Hoopoe, Golden Oriole, Capercaillie, Ptarmigan, Dunlin, Sandwich Tern, Pratincole, &c., &c.

BY H. R. PARRINGTON.—Several species of *Coleoptera*

BY A. C. ALMACK.—Specimen of Cup-Lichen.

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By F. C. Lightfoot.—Skull of a Roman found in Northamptonshire, having been buried about 1500 years. *Humerus* of Man, found in St. Paul's Churchyard, London. Skeleton of Tawny Owl. Skulls of Horse, Dog, Babyroussa, and various other animals. Bone with Gelatine alone remaining. Ditto with only earthy matter remaining. Vertebrate column of Ichthyosaurus, and a gigantic vertebra of the same.

By H. W. Hockin.—The skull of a Gull, found on the beach at Hayle, Cornwall.

A paper was read by F. C. Lightfoot, illustrated by drawings made by himself, on

THE BONES AND MUSCLES OF VERTEBRATE ANIMALS.

I at first intended to have spoken about the construction of bones only, but as that would have made too short and dry a paper, I have chosen this subject, not without great hesitation, as to whether it comes within the pale of Natural History.

The most important of the hard parts of animals are, Shells, Crusts, and Bones, the two former of which are void of vitality, while the latter has every appearance of being in the possession of life. In shells hardly any animal matter is found: they have almost the same construction as marble-crust (as the lobster's or crab's claw), and possess animal matter to a small extent, whereas bones possess it largely. The earthy matter in bones is not only less in quantity, but is also of a different kind. In shells and crusts the earthy matter is carbonate of lime (better known as chalk), while in bones the lime is combined with an acid composed of phosphorus and oxygen, forming phosphate of lime. I may here add phosphorus is artificially prepared from bones, and sold in the shape of sticks. The quantity of animal matter, and consequently the hardness of the bone, varies in its different stages. In youth the animal matter predominates; in old age the earthy. On an average in mature age the proportion is about two-thirds animal matter (mostly gelatine and albumen) to one-third of earthy. Mere hardness is not all that is wanted, for were this the case, bones would be almost entirely composed of earthy matter, and would consequently be easily broken. The composition of bones, therefore, is such, that the earthy matter gives stability to the framework, on which all the other parts depend for the exercise of their several functions, while the animal matter imparts to it adhesiveness and toughness. All parts which afterwards become osseous are originally in the state of cartilage (or gristle); this is then gradually removed, and bone is deposited in its place, and ultimately in its highest state of development, the bone is hollowed out internally, and filled with marrow, or, in the case of birds, with air. Some of the human bones are completely ossified at birth, as is the case with the bones

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of the ear; some parts, however, remain cartilaginous in manhood, and are ossified only in old age. This is the case with the cartilage that joins the ribs to the breastbone, and so, on becoming ossified in old age, it impairs the breathing, which was formerly assisted by the elasticity of the cartilage.

The first object in laying the foundation of a skeleton, appears to be, to provide for the safety of the brain and spinal marrow. Accordingly, when other parts of the skeleton are wanting, the back-bone or spine is always present; and in the human race, and in all the other *vertebrata*, this is always the first part of the osseous structure that is developed. It is composed of a series of rings or *vertebræ*, the juncture of which varies in different classes. Each side of a vertebra, in fish, forms a cup, and, consequently, when all the vertebræ are joined, two cups are always opposed to each other, and the cavities thus formed are filled with a jelly. In reptiles the junction is of the ball and socket kind, the ball of one vertebra fitting into the socket of the other above it. The surfaces of the vertebræ in the mammalia are nearly flat; and in man, especially, between each there is a layer of tough elastic gristle, which is of great use in breaking the shocks that are sustained in running and jumping. The articulation of the spine with the skull in the mammalia exhibits one of the most peculiarly complicated pieces of mechanism that is to be met with. It is necessary to have a double hinge to enable the head to be moved sideways, and to be also moved forwards and backwards as in nodding; this is far too complicated an instrument for me to explain, so I will not attempt it. When you look at the human spine, you find it a most curious piece of mechanical art, combining the apparently incompatible requisites of strength and flexibility. This flexibility is principally caused by the number of pieces employed, which are nevertheless firmly joined together. If you try to separate the vertebræ of a hare or rabbit by main force, you will then see how firmly they are joined together.

Above the spine comes the cranium, or skull, which consists of a number of separate pieces, joined together, forming a case for the brain, like a strong arch. In the bird the head is at the end of a long neck; and to counteract the length of neck the skull is extremely light, the skull of a common fowl weighing about as much as a sixpence. In the cow and other animals, as the camel, the neck is necessarily long, and the head is also heavy; to enable them to raise their heads, powerful muscles are attached to the skull and vertebræ of the neck, and a strong ligament or cord has been provided by nature. But in the elephant the weight of the head is so enormous that the neck has been made so short as to require a proboscis or trunk, since its muscles, strong as they are, could not raise the head had the neck been long.

The collar-bone is one of the most interesting parts I have not yet mentioned. It is interesting in this way: this bone is quite perfect in man, imperfect in the lion and tiger, and wholly wanting in most of the herbiverous

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animals. A question immediately presents itself, What is the reason for these differences? The reason is this—This bone is only brought into use when the upper parts of the body are much used in laying hold of things, as in man, the ape, &c. It separates the limbs, and so gives them sufficient extent for action. Of what use would this bone be to a horse? Why none. When we put out our hands to prevent running against anything, the fracture or dislocation of this bone often ensues, thereby saving the fracture of the arm. But when a horse gallops down a hill the shock is much more violent, and yet no bone is broken. But what is the cause of this? The fore-legs, instead of being joined to the body by bones, are joined by two large fleshy muscles attached to the shoulder-blade. The breast-bone, which is so important in the human frame, from the ribs being joined to it, is almost rudimentary in fishes, as the heart, and gills, which correspond to our lungs, are situated close to the head. The same bone is very large in birds, on account of their wings; and in the turtle and tortoise it is so large. that it entirely covers the under portion of the body, and forms a protective covering for the animal.

When you look at the paddle of the porpoise, you would call it a bad representation of the human arm: bones may be seen corresponding to the humerus, radius, ulna, &c. of the human arm; but when you come to the fingers, a great difference is seen. The porpoise has in its longest finger *thirteen* distinct bones, while the man has only *three* in the real finger, not counting the bone in the back of the hand (the metacarpal bone). The skate's body resembles two hands largely expanded. In each of the sketches I have shewn, you can trace the great resemblance to the human arm.

The bones that form joints are firmly connected by what are called ligaments; they are also covered at their extremities with smooth gristle, to enable them to move easily on one another, and to assist this movement a kind of oil is poured into the joint. The kinds of joints are various. The *hinge* joint at the elbow, admitting only a backward and forward motion, and the *ball and socket* joint at the shoulder are the two principal ones, the latter admitting movement in all directions. The hip joint is also on the ball and socket principle, but the socket is much deeper to give greater security to the joint against dislocation, as on it hangs the whole weight of the trunk.

I have now mentioned all the most remarkable bones, and I am afraid my paper has been too anatomical. I will now say something of the muscles, being the agents by which the body is set in motion. To prove the contractile power of the muscles, the finger need only be placed at the angles of the lower jaw, and on firmly closing the jaws, this power will then be felt. The contractile power of muscles is quite different from elasticity. As Dr. Hamilton observes: "The first is an original source of power, while elasticity

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merely modifies its distribution. Thus, it is the elasticity of the mainspring of a watch that keeps it going for twenty-four hours, but the muscles of the hand which winds it up, is the true moving power." The muscles are generally collected into bundles, consisting of large and small mixed indiscriminately, and those used in moving the skeleton are attached to the bones, and commonly end in tendons of great strength. Professor Ehrenberg states, that even in animalcules, when these minute creatures are darting through the fluid, he has seen parts contracting which he thinks are muscular bands. In oysters, there are distinct, strong muscles, enabling them to close their shells firmly. The muscular system of the *Articulata* is exceedingly well marked, and consequently their strength is very great, *four thousand* muscular bands having been counted in one caterpillar; and to take another instance, a beetle placed under a candlestick is able to move it. Again a small insect, the *Cicada spumaria* will jump five or six feet (about two hundred and fifty times its own length) which, Dr. Roget remarks, if the same proportions were observed, is the same as if a man of ordinary stature were to vault through the air a quarter of a mile.

Muscular action has been chiefly studied in the vertebrata. Anatomists have given names to between *four* and *five hundred* muscles in the human body, but the parts of what is called a single muscle often have different and even opposite uses. Professor Grant states that in the proboscis of an Elephant there are nearly 1000 muscles. The different expressions of the human face are owing to muscular contraction, and even in the lower animals, we see that the feelings to be expressed and the parts with which they are to be expressed are in unison. A cow cannot snarl like a dog, but why is this? The answer is easy. Because the cow wants the particular muscles that the dog has, for drawing up the sides of its mouth. The muscles are arranged for the most part in sets, opposed to each other, one set to bend the limbs, and a second to straighten them; a set to lower the head, and a set to raise it; and it is said that it is by muscles that the mouth is kept in its proper place.

Some of the different modes which Nature provides for the accomplishment of progressive motion among the vertebrata are—two legs in man, the legs and tail in the kangaroo, and the tail in fishes. Her most beautiful contrivance, *flight*, has foiled all the ingenuity of man to imitate. To assist motion through the air, nature has two great ends in view—first, to lighten the body as much as possible, by making the solid parts thin and hollow, and filling them with air, (thus a skeleleton of a pelican, five feet long, is found to weigh only twenty-three ounces), and secondly, to place the muscular power in those parts which are used for motion. A flap from a swan's wing has been known to break a man's leg, and the swallow's pectoral muscles which move its wings are stronger than all the others put together, which fact may be easily accounted for when we consider that it often travels about one thousand miles

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a day. People whose occupations compel them to sit down much, and girls who are hard worked at school, and have not sufficient exercise, suffer greatly from the muscles which should keep the spine straight being weakened, thus allowing the spine to become crooked. Dr. Forbes states, that on visiting a certain school consisting of forty girls, he did not find one who had been at the school for two years whose spine was not more or less crooked. Mr. Shaw states, that for *one poor child, twenty rich ones* are affected; that among the poor children the proportion of boys and girls so affected is equal; but that among the rich for one boy, one hundred girls are affected. When the earthy matter predominates in bones, fracture very easily occurs. Dr. Good saw an old lady who broke both her thigh bones from kneeling down in church, and whose arm broke while she was being raised, but I suppose this is a very exceptional case.

After the Meeting a discussion was entered into on the proposal of the President that Archæology should henceforward be admitted as a branch of the Society's studies. After some observations from various Members, it was announced by the Committee that this proposal would be carried out.

It was also decided that the Members should form themselves into Sections, to join which any other Members of the School should be invited: that the object of these Sections should be to make more real progress in Geology, Entomology, Botany, Ornithology, and Archæology, by mutual assistance, and that henceforth Proceedings at the General Meetings of the Society should be regulated by the Sections, so as to make them more systematic and useful.

There were Thirty-nine persons present.

MEETING HELD MARCH 16TH, 1866.

Geology.

OAKELEY exhibited a fine specimen of Trilobite (*Blumenbachii*), from the Upper Silurian at Dudley. A slab of fossils, containing among other specimens *Rhynconella*, Silurian Corals, Stems of Encrinites, &c., from Dudley. Curious sand concretion, exhibiting great resemblance to some organism. A fine specimen of "Petrified Moss," from a spring near Monmouth. (Mr. Mullins spoke at some length on the geological formation at Dudley.)

Archæology.

OAKELEY exhibited a fragment of Roman pavement, shewing the cement in which the mosaic was fastened.

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Mr. F. E. THOMPSON exhibited a "Simnel Cake." He entered into the origin of the name, and gave a description of Bishop's Cannings Church.

Zoology.

— OAKELEY exhibited a box of bones, principally of the Mouse, which had been found in great numbers in a cave near Monmouth. At first sight they appeared to be fossilized.

The Rev. T. A. PRESTON exhibited Skulls of Man and Gorilla.

Botany.

The Rev. T. A. PRESTON exhibited a Pinon—the fruit of the *Araucaria*, or Monkey-Puzzler,—the seeds of which are cooked and eaten like chestnuts in Chili. Pod of Vanilla from the West Indies, being the seed-vessel of a species of Orchis.

J. POLE exhibited a small collection of mosses, obtained in a short time near the College.

A Paper was then read by the Rev. T. A. Preston, which he illustrated by numerous preparations of the plant, on

THE POTATO.

No plant has ever spread with such rapidity or so universally as the Potato. Introduced by Sir Walter Raleigh in 1584, it has had a very varied existence, —praised and abused in turn—but it has survived all calumny, and is now, perhaps, the most important article of food known.

The origin of the name Potato is curious. Though called by the North American Indians *Openauk*, those dwelling near Quito called it *papas*. This the Spaniards corrupted into *battata* : this again was softened by the Portuguese into *ba-ta-ta*, whence by a further process of corruption we get the name Potato.

It is needless for me to describe the appearance of the potato plant : suffice it to say that the flowers are very similar in appearance and structure to those of the common Bitter-sweet or Nightshade of our hedges, whence we know that it belongs to the *Solanum* or Nightshade family. This is an especially poisonous family, and hence we may conclude that the Potato plant itself is poisonous. As grown in our gardens this appears not to be the case, as every part of it is more or less useful for food ; the young shoots, however, are found to be poisonous, containing distinct traces of the poison *solanine*, which, when eaten by cattle, causes paralysis of the hinder parts. But this poisonous property seems to depart with age, and hence we find that the green tops are occasionally eaten as spinach, and Evelyn mentions the "apples" as forming a good ingredient for salad, which, however, does not seem to be borne out by experience. The water, too, in which potatoes have been boiled, is frequently injurious to animals who drink it.

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In addition to these uses of the parts of the plant which are generally thrown away as useless, it may be observed that from the leaves and flowers an anodyne medicine (for allaying pain or causing sleep) has been extracted; from the flowers, a yellow dye; from the stem, fibres equal to flax have been procured in Germany, and the leaves are often used as a substitute for or adulteration of tobacco; the stems also when burnt supply large quantities of potash; a good paper-making material has been procured from these same stems, as well as from the pulp of the "root" (to be noticed hereafter); and from the "apples" spirit and vinegar have been distilled.

But these products, though capable of being greatly increased in numbers, and obtained in far greater quantities than has hitherto been done, are perfectly insignificant when compared with what can be obtained from the *tuber*, the part which we generally use as food.

It will be necessary to describe accurately what part of the plant this is. The *tuber* is a portion of the underground *stem*, and has nothing whatever to do with the root. It is, in fact, a portion of the stem of the plant, swollen out for the purpose of containing a store of food, and is therefore really the perennial part, all the rest dying away annually. That it is a part of the *stem* and not the root, is known by the fact of its having leaf-buds, commonly called "eyes." If a potato be allowed to germinate under cover of a flower-pot, so as to be kept in the dark, the portions which usually appear as roots will be found to have assumed the character of branches, on which will be seen swollen portions, some at the tips of the branches, others close to the parent stem, easily recognisable as potatoes, though all will be covered with scales, the rudiments of leaves.

If a thin slice of potato be placed under a microscope, it will be found to consist of nothing but a mass of cells, many of them partially or entirely filled with small grains, commonly known as *starch*. But it is astonishing what an enormous quantity of water is contained in the tuber. Roughly speaking, at least three-fourths of the potato is pure water, not more than one-fifth starch, and the remainder made up of the pulp forming the cells, and various other compounds—the most important of which is *caseine*, so called from its smell resembling that of cheese. It is this part of the potato which contains nitrogen, an essential part of food necessary for forming muscle; the starch, though useful in forming fat, cannot contribute to the formation of flesh: and we see, therefore, how necessary it is to have a mixed diet of animal and vegetable food to keep us in a proper state of health. Still, as potatoes have a small quantity of this nitrogenous compound, they can support persons in health when taken in sufficient quantities, but on account of the large quantity of water in their composition, it is clear that a very large quantity of potatoes must be eaten by a healthy person in order to obtain the requisite supply of necessary food—hence those who live entirely on potatoes are generally very corpulent.

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But I would now direct your attention specially to the *starch*, as it is a most important article of commerce—no less than 150,000,000 bushels of potatoes being annually grown in America for the starch alone.

The starch is not distributed equally in all the cells—those nearest the skin having by far the greater quantity. This is important in a domestic point of view, for the thicker the parings of the potato, the greater the loss of starch, and hence the homely saying, "Pare thin the potato skin" becomes very significant.

The amount of starch, too, varies according to the time of year. Thus it has been found that out of 240 lbs. of potatoes, 23 lb. to 25 lb. have been obtained in August, 32 to 38 in September, 32 to 40 in October, 38 to 45 from November to March, 38 to 28 in April, and 28 to 20 in June. Hence, in order to secure the largest amount of starch, it will be seen that the potatoes ought to be used during the winter months.

A very curious and very interesting fact in connection with the potato disease must now be noticed. This disease, though rotting the tuber, and rendering it unfit for food, has no effect upon the starch—at least, not till the tuber itself is quite rotten. During the time of the potato disease in 1847, enormous quantities of starch were procured from the diseased potatoes, and the price of potato starch consequently went down to as low as £12 a ton, though its average price is from £22 to £24 a ton, and it has been known to be as much as £30 the ton. The late Professor Henslow used to send round a tub to the various cottages, and in this tub all diseased potatoes, as well as the diseased parts which had been cut away, were put: from this he had the starch extracted, and stored up in his kitchen, and as he himself used it in his household, the poor people not only used it themselves, but applied for it when necessary.

Manufacturers of starch will, of course, want to know the starch-making quality of the potatoes which they purchase. The Germans have the following plan:—a series of solutions of salt is prepared, of different degrees of saltness: the potatoes are then placed successively into these solutions, till the solution is found in which they just float. Knowing the density of the solution, they can tell the value of the potato.

Before leaving this portion of my subject, I will say a few words on mealy and waxy potatoes. The starch in the cells of the potato consists of grains covered with a hard skin which is insoluble in cold water, but when put into boiling water this outer covering bursts and the contents swell up into a jelly, occupying of course a much larger space than before. If, then, the potato cells are well filled with starch, these grains when properly heated will swell out and burst the cell of the potato, and thus when there is a good supply of starch grains, the potato will be completely pulverized, and present a mealy appearance. If, however, the starch grains in each cell be few in number,

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they will be unable to burst the cell wall, and hence a waxy potato is produced. From what was said before about the starch grains being more numerous near the skin, it follows that the outside of a potato is most mealy, and even in some cases will be the only mealy portion, the centre part being thoroughly hard.

When potato starch is used for stiffening linen, these small skins will still exist, as they have merely been burst, and consequently the starch will not be perfectly clear. The Glenfield Starch Company have overcome this difficulty by mixing with the potato starch a trace of sulphuric acid, which thereby converts the insoluble starch into the transparent substance called *dextrine*.

I will now pass on to speak of the starch itself. To give some idea of its importance, 27,000,000 pounds of starch are made annually in France alone, and we may conclude that the uses to which it is applied are very numerous. A few of these I will now endeavour to describe.

Let me, however, first explain *how* the starch is obtained. Since it is contained in the cells of the potato, the first thing to be done is to burst these cells. The potatoes are therefore carefully washed (a very important process), and rasped and mashed up into a pulp. This pulp is put into a fine sieve, and water poured upon it, which will carry all the starch grains with it, when squeezed out of the pulp, and if the water is allowed to stand a short time, the starch grains, being very heavy, will sink to the bottom. The water is then poured off, and the starch is obtained in a very tolerable state of purity. But there is still a certain amount of deleterious matter with it, and a weak solution of carbonate of soda is therefore used, which effectually removes all hurtful impurities; the starch is then dried and pounded.

It is a curious fact that however poisonous a plant may be, its starch is always perfectly wholesome; and what is still more curious is that all these poisonous properties are soluble in water, and therefore by a proper amount of washing everything hurtful may be removed. Thus the plant from which the tapioca (*Janipha manihot*) is obtained is exceedingly poisonous, but the poison can be removed by the mere process of washing.

The starch thus obtained is at first sight very similar to arrowroot, though it can easily be distinguished from it and from other starches by means of the microscope, because potato starch grains are almost the largest known. Their shape is also different, and a practised eye can tell the difference at once. But still everybody does not know this, and consequently a very large quantity of what is sold as arrowroot is nothing but potato starch. This adulteration is perhaps the least harmless of any, but the great disgrace is that the dealer sells the compound for far more than it is really worth, arrowroot being worth 2s. 6d. per lb., whereas potato starch is not worth more than from 2d. to 4d. per lb. It also requires more potato starch than of the real article to make a cup of "arrowroot," and the consumer is cheated in that way also.

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Starch has the property of absorbing large quantities of water, and hence the merchant has to be careful how he pays for it. It is generally sufficient to rub a little in the hand in order to discover its dryness, but a more satisfactory way is to drop a small quantity on a hot iron or metal plate. If tolerably dry, the grains fly about, but if very damp some will burst, and the grains will form themselves into hard lumps, greatly resembling tapioca, and thus we get a second form of adulteration. Large quantities of tapioca sold in shops are merely potato starch thus prepared. Preparations of potato are also used as *Vermicelli*, and such like articles. Other preparations are made by mixing the starch with gum, &c., and in fact an innumerable number of adulterations are made, different in shape and appearance, but not in material, remaining essentially nothing but potato.

By these and similar means potato starch may if necessary be slightly altered in appearance, but even without taking this trouble a grand sounding name will generally be sufficient to afford a very ready sale for potato starch, thus *Indian Corn Starch*, *Potato Flour*, and *English Arrowroot* are generally nothing but our old friend under a very slight disguise.

Lastly, potato starch mixed with chalk and diluted with a little water forms a very beautiful and good white for ceilings. This composition has no smell, and is more durable than that ordinarily used.

Thus we see how extensively pure potato starch is used, without undergoing any process for adulteration; and when it is remembered that this article is often adulterated with gypsum, chalk, and other such substances, we can understand some of the methods by which cheating in trade has grown to such an enormous extent.

Many plans have been devised for preserving potatoes, but one of the most extensive preparations is that adopted in France, and called *polenta*. The potatoes are boiled or steamed, peeled, and then by various processes separated into coarse grains. If stored in a dry place, this polenta will keep good for a long time. It is used for thickening soups and making other food dishes of various kinds.

Another method of preserving potatoes is by cutting them into thin slices and drying them. In this form they are known by the name of *Potato chips*. When potatoes are attacked by the disease, provided they are not greatly infected, the effects of the disease may be arrested by slicing them and washing them in a very weak solution of sulphuric acid (2 or 3 per cent of acid). If the potatoes are afterwards well washed in pure water, so as to remove the acid, and then dried, they are serviceable in the form of chips.

There is really no such thing as potato *flour*, in the usual acceptation of the term. If wheat flour be put into a coarse cloth and then well washed in pure water, the starch will be removed, and a considerable quantity of a gummy substance will be left—this is called *gluten*. Now starch having no *gluten*

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cannot form a paste, but when mixed with corn flour it is considered by some to improve the quality of the bread: it must, however, be used in moderate quantities – if more than one-fifth of the weight of wheat flour be used, a very unpleasant flavour is communicated to the bread from the presence of potato spirit, to be noticed hereafter.

Now the great use of starch to the plant is for the purpose of supplying nutriment to the young shoot when germinating, and feeding it till it is able to take care of itself. But starch in its ordinary state is unfitted for this, and consequently when the plant begins to sprout a change takes place in the starch, and it is converted into a substance called *dextrine*. This same effect is produced in the potato when it is frost bitten; and hence germinating and frost-bitten potatoes have a sweetish but very unpleasant flavour.

This same conversion of starch into dextrine can be produced by heating it, or by the action of heat aided by a minute portion of nitric acid, and if this process be repeated or continued for some length of time, the dextrine becomes further converted into sugar; this sugar cannot be crystallized, and as it is found in the juice of the grape (as well as in other fruits) it has received the name of *grape sugar*. It is thus in a large variety of forms that we meet with starch products.

Common *dextrine* is used most extensively as a gum, and is sold under three different forms—(1) as a powder, (2) as a syrup, and (3) as a gum very like gum arabic. In this last form many persons were afraid that it could be used as an adulteration of gum arabic, but there is no fear of that, for potato gum has a peculiar smell and taste (of potato oil) which will at once betray its presence.

Dextrine in its first or powdery form is used greatly by the manufacturers of cheap silk and cotton goods. In consequence of the rage for *cheap* articles, the manufacturers must replace a portion of the silk or cotton fabric by a cheaper substance—hence they weave their goods very loose and then pass them through a solution of dextrine. This swells out the stuff, and so long as it is unwashed it does very well; but the least wetting will of course reveal the true state of the case. To such an excess has this plan been extended that the manufacturer makes enormous profits. "With farina at 2d. or 3d. a lb., it must be very profitable to sell yards of starch at even a much lower price than the lowest cotton goods could be supplied," as Mr. Simmonds remarks. In fact, in 1859, one Manchester house used no less than 6,000 cwts. of starch for this purpose, and the manufacturer may almost be said sometimes to make his cloth a vehicle for potato starch. Another use to which this dextrine is put is that of gumming adhesive labels and postage stamps.

The story of the discovery of this dextrine is worth recording. A workman who had been present at the burning of a large starch manufactory, and had been assisting in bringing water to put out the fire, discovered on getting

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up the next morning that all his clothes were perfectly gummed together. Some of his comrades who had also been at the fire, experienced the same inconvenience, and they therefore visited the scene of their previous night's exertions. They found the starch converted into large masses of gum, and on going home they instituted a series of experiments, and obtained a very fair sample of gum, though not sufficiently pure for the calico manufacturers. They sold their secret at last, but it was some years before the gum came into general use. A very interesting account of its history is given in "Household Words," vol. 5, under the title of the "*British Gum Secret*," but is too long to insert here.

The gummy form of dextrine is made by boiling it in the state of syrup, and keeping it at a temperature of 40° or 50° for 24 hours. It will then acquire the consistency of jujube paste. After this it is cut up with a pair of shears, and rolled out on a smooth table, and left for three or four hours to dry. It is packed more readily than when in the powdery form, and from its not fermenting is preferable to liquid gum.

Grape sugar is also called glucose, and being very easily and cheaply made, it was at one time extensively used for adulterating cane sugar. The excise authorities, on becoming aware of this, imposed a duty on it, since which time it has ceased to be prepared. As an instance of the great profit derived from the manufacture of grape sugar, 1 cwt. of starch produces 140 lbs. of sugar.

Glucose can also be obtained in the form of a treacle. A few years ago golden syrup was much in vogue—it is believed to be nothing but this glucose. In this form of syrup it is largely used by the French confectioners, and from having a large quantity of viscous matter in its composition, it is eminently suited for making beer, and is largely used for this purpose in Germany. Ship beer is also brewed from this starch sugar, and is proof against climate.

In connection with the "spirituous" portion of the subject, may be mentioned the fact that as potatoes are very readily fermentable, they are used in distillation. The Scotch distillers use them freely, but to nothing like the extent to which the manufacture is carried on on the continent. In Prussia 7,000,000 bushels are used annually for the purpose of brandy-distilling. Stettin brandy, well known in commerce, is largely imported into England and re-shipped to Australia and other foreign possessions as Cognac, and is placed on many tables in England as the same; while many people perfume themselves with the spirit of the potato, under the designation of Eau de Cologne, in the cheap imitations of that perfume which are sold. The exceedingly strong, colourless spirit used for doctoring sherries when imported into England, is merely the potato spirit, highly refined.

In Poland there is a most extensive manufacture of potato-whiskey, called there Wodka. It is a most detestable compound, but being very cheap (7½d. to 10d. a gallon), it has an enormous sale, the consumption being about seven

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gallons per head. 2,500,000 gallons were made in Saxony in 1851, and in Norway, between 1st October, 1855, and April 30, 1856, over 2,000,000 gallons were made.

When potato brandy is made, there comes with it a very peculiar spirit called *fusile oil*, or *potato spirit*. It can be separated from the brandy, to which it gives a very unpleasant taste. From this fusile oil many artificial essences, &c., are made. The essence of Jargonelle pears is made from it.

Two other extraordinary products of potato may be mentioned—

(1). *Coffee*. A French chymist has asserted that by mixing a certain portion of olive oil and potato flour together, and then adding a small quantity of coffee-powder, a very near resemblance to coffee can be obtained; and

(2). *Cheese*, made in Thuringia and Saxony. The large potatoes are boiled, peeled, and reduced to a pulp. To 5 lb. of this pulp add 1 lb. of sour milk, and some salt; knead together, and after four days repeat the process, and then leave it to dry in baskets. In about 20 days altogether the cheeses are fit to eat, but improve by age. They do not engender worms, and will keep good for a number of years if stored in a dry place and in well-closed barrels. They are made of various qualities.

Such are a few of the products of the potato. But a few *bye* products may be mentioned. The water from which the starch is deposited is well suited for irrigation. It holds the nitrogenous part in solution, and if kept a short time produces an evolution of sulphuretted hydrogen gas. This water is also useful as a scourer for cleaning silks and woollens. It is also used as a cure for chilblains. The pulp after extracting the starch is useful for pigs' food, though this is denied by Professor Henslow. Whatever view be taken of this point, however, it is undeniable that the versatile and wonderful potato can be converted into picture frames, paper, and many other articles usually made of paper.

There were thirty-nine present.

MEETING HELD MARCH 29th, 1866.

Ornithology.

A. C. Almack read a short list of the eggs obtained during the past fortnight, and exhibited those of the Wood-wren, Butcher-bird, Woodchat, Red-backed Shrike.

A. Herklots exhibited a remarkably small specimen of a Rook's Egg.

Archæology.

F. C. Lightfoot gave a short summary of the proceedings of this Section since the last Meeting.

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Rev. T. A. PRESTON exhibited a Half-Groat, found near Cirencester.

Entomology.

W. W. DAYMAN mentioned the notices of Lepidoptera that had been brought to him during the half-year. Among them were four species new to the College List.

The Rev. T. A. PRESTON exhibited a large box of Brazilian Insects, among them specimens of the "Emperor Moth," 14 inches across the wings, the "stick insect," some magnificent specimens of butterflies, a great variety of very remarkable leaf insects, and several Coleoptera.

Botany.

Rev. T. A. PRESTON passed round a list of the notices of plants as yet obtained. He also exhibited dried specimens of Arnotto, Allspice, Tea, Arrow-root, Cinnamon, and Vegetable Ivory.

A. MARSHALL exhibited a Paper-knife of Sandal-wood, with a dried specimen from the tree.

H. A. EVANS then read a paper on "THE CLASSIFICATION OF INSECTS."

There were forty-four present.

MEETING HELD APRIL 13th.

This Meeting was held in the Modern School.

The following donations were announced, and thanks ordered to be given to the donors:—

"Recreative Science," "Popular Science Review," and "Intellectual Observer," complete, by REV. J. M. FULLER, who kindly undertakes to continue the same, and to bind up the parts yearly.

A donation of £5 by the Right Hon. T. H. S. SOTHERON ESTCOURT.

An annual subscription of £1 by CHRISTOPHER HODGSON, Esq.

Entomology.

W. W. DAYMAN gave a short report of the Entomological notices during the past fortnight.

G. K. MILLS exhibited a specimen of the Tussock (*D. pudibunda*).

Ornithology.

In the absence of A. C. ALMACK no report was made.

Botany.

Rev. T. A. PRESTON read out a list of the principal notices taken during the previous fortnight, and mentioned the discovery of two species of

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Stonecross (*Sedum*) by G. F. Ruck and H. A. Evans. He also exhibited the pericarp of the Brazil-nut, specimen of the gulf-weed (*Sargassum bacciferum*), a specimen of the Jew's-ear Fungus (*Auricula Hirneola Judæ*) found at Preshute, and specimens of Cumshaw Ball Tea, Cumshaw Present Tea, made up in the shape of faggots or cigars, and Burmese Brick Tea.

F. C.

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MEETING HELD MAY 4, 1866.

The following donations were announced, and thanks ordered to be given to the donors :—

A pocket microscope, by R. G. CLARKE, Esq.

A donation of one guinea, by Mrs. NORRIS, Epsom.

An annual subscription of £1, by R. HUNTER, Esq.

The "Geologist," by Rev. T. CORNTHWAITE.

Geology.

C. A. HARRISON gave a report of the working of the Section, and exhibited a drawer of various specimens, among which were a horse-shoe, which had become oxidised, and converted the mould in which it was embedded into a substance resembling iron ore. A huge specimen of Scaphite, from the Isle of Wight, to show what may probably be found here; and the following fossils found in the neighbourhood: Fragment of large *Inoceramus*, by W. J. Greenwell; *Plagiostoma Spinosum*, and Shark's Tooth.

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Entomology.

A. MARSHALL gave a list of the notices of captures during the past fortnight. He then showed a Humming-Bird Hawk Moth (*M. Stellatasium*), captured by R. W. Wickham, on April 25.

The PRESIDENT exhibited a specimen of Bombex Cynthia, the new Silkworm Moth recently introduced into England; the New American Moth-trap; specimens of Stuffed Larvæ of Swallow-tailed Butterfly (*P. Machaon*); Oak-eggs (*L. Quercus*); Drinker (*O. Potatoria*); Gooseberry Moth (*A. Grossulariata*); Vapourer (*O. Antiqua*); Gold-tail (*P. Aurifua*); Dagger (*A. Psi*), etc.

Ornithology.

A. C. ALMACK read out a list of the notices, comparing them with last year, and exhibited specimens of the following eggs: Daulin, Chough, Roseate Tern, Leoses Tern, Spoon-bill from his own collection; nest and three eggs of Ring-Ouzel, taken near Savernake House, May 2, by E. H. Parr and J. W. Parrington, egg of the Stone-chat, and monstrosities of the following: Yellow-Hammer, House-Sparrow, Rook, Blackbird, Cochin-China, and Common Hen, all taken this year in the neighbourhood.

The PRESIDENT exhibited a living specimen of the Night Jar, taken near Polton.

A. MARSHALL exhibited a leg of the Emu.

Botany.

The PRESIDENT passed round a list of the notices for the month of April, comparing them with last year, and exhibited a specimen of the Hautboy Strawberry (*F. elatior*), found by R. R. P. Hilton, and hitherto unrecorded.

Zoology.

The PRESIDENT exhibited a Viper and a Common Snake.

E. ALMACK exhibited a specimen of the Thorny Oyster, and Palate Teeth of the Port Jackson Shark.

R. B. MAINWARING exhibited a large Shark's Tooth, and piece of Palate of Shark's Mouth.

R. F. ISAACSON was elected to fill the vacancy in the Committee caused by H. A. EVANS' departure.

Archæology.

F. C. LIGHTFOOT read the following paper, by H. M. Moule, Esq., on

BARBURY CASTLE.

THE neighbourhood of Marlborough teems with the relics and vestiges of early British civilization—a civilization now not only *past* but *dead*; past, that is to

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say, without having left behind it any appreciable results which live and fructify among ourselves. For all, or very nearly all, that we now are in the scale of nations, we owe—not to our aboriginal ancestors—but to the successive invaders of our shores. Still, with Saxon and Norman influences predominating in our blood, and with Greek and Roman influences ruling in our national brain, we cannot help, notwithstanding, every now and then throwing a wistful glance backwards into that remote and dark antiquity which we understand so imperfectly, but from which we cannot wholly disconnect ourselves. The charm and interest of archæology is certainly most various. Salisbury Cathedral speaks home to our hearts in tones of nearly perfect harmony; Stonehenge enchains our sympathy with, perhaps, scarcely inferior power, though uttering in comparison a strange and scarcely articulate appeal. It is just so, in their proper degree and proportion, with the earthworks, small and great, which stud the

broad backs of our bushless downs.

There they lie, without a voice and almost without a history. Literature throws only a rare and scanty ray here and there upon them: some few passages in Cæsar, some disputed notices in the Saxon Chronicle, make up the bulk of our written information respecting them. Few minds, however, that are not either inactive or narrow, will fail to discover a charm even in this very obscurity; and the earthworks will probably continue to present riddles and problems which, whether solved or not, will interest and instruct us.

One of the finest relics of British work near Marlborough is Barbury Castle, which stands on the end of a magnificent reach of downs, about six miles north-west of the town. It occupies an intermediate position between the fort on Martinsell and Liddington Castle, which lies about four miles further away to the north. Barbury commands a splendid range of view; it is perhaps hardly too much to say that an experienced commander from that lofty post might have detected any hostile movement whatever that was on foot within a radius of ten miles, and in some directions to a greater distance still.

This earthwork of Barbury is oval in form, and is surrounded by a very regular double rampart, with an imposing trench between the banks. The dimensions are these, according to Sir R. C. Hoare:—

Entire circuit of outer rampart	880 yards (½ mile)
Depth of trench	47 feet
Area within trench	12½ acres

The old fort lies about east and west; and the eastern extremity is protected by a barbican or outwork, the mounds of which are most distinctly traceable.

Barbury was undoubtedly used as a *rendezvous* and fastness during the Saxon period. The British earthworks were very generally converted by the

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Saxon settlers to their own purposes. In some remains, it is easy to detect alterations of design, enlargement in certain directions, curtailing in others. The true mark of the *Roman* soldier is, of course, the parallelogram figure, in which his camp was invariably drawn out, as distinguished from the irregular oval of the British designer. Putting aside, however, the marks of Saxon interference at Barbury, enough remains to convince the antiquarian that it was a *bona fide* Celtic work, forming, probably, one of a large chain of forts, of which Martin's Hill and Liddington were the two nearest links.

As a means of illustrating the extent and probable uses of these great hill-forts, let me briefly mention a few points relating to *Maiden Castle* (or the Castle of the "Great Hill" [Brit. *Mai, Dun*]), which is a work lying about two miles to the south-west of Dorchester, the county town of Dorset. This work, the completest fort of first-rate dimensions in Great Britain, is raised on a gentle slope of down, the scarping of which has been on the north side improved and made use of as the outer rampart. The entire area within the innermost rampart is *forty* acres, or rather more than three times the size of Barbury. There are three ramparts, with two trenches, and the outermost of these trenches measures not less than *seventy* feet deep. At two points in the circumference the entrances to the interior area are contrived so as to be very fully protected by overlapping the ends of the ramparts, and the design in this respect (so far as it goes) is as elaborate as anything in modern engineering science. This great work is, however, quite destitute of water supply. There are, it is true, one or two points in the area at which it is conjectured that wells may have been sunk, but these traces are extremely vague and uncertain.

Partly from this want of water, and partly from a general survey of this and similar works, it is conjectured with great probability that the use of hill-forts was as follows:—In time of war, the chief of a tribe would collect together all his fighting-men, and that would signify, generally speaking, the bulk of the able-bodied adults belonging to the tribe. Great numbers of these would have to leave homes unprotected, and cattle or sheep running loose, unless some temporary provision were made for both. That provision was supplied by the hill-forts, just as is now the case with the "pahs," or temporary enclosures employed by the New Zealanders. Inside a hill fort like Maiden Castle, the women and children and the cattle of a very numerous tribe, might well be encamped for a limited time. During that time they would be provisioned partly by supplies taken in with them, partly by the exertions of the fighting-men outside. In this way also, or at any rate by the additional aid of small temporary wells, they could for a short time be supplied with water. Had the hill-forts been meant to act as permanent towns, doubtless far more extensive traces of water-works would be now visible. The immediate

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danger over, the defenceless inmates of the fort could gradually make their exit, returning to their homes in case of victory, or seeking fresh ones in case of defeat.

Such was the probable purpose of Barbury Castle in the minds of its original designers. The Saxons turned the forts into war-centres or places of meeting for the reeve-men and yeomen of the divisions called "Hundreds," which divisions still frequently appear in legal documents, though they have no legal force—the county, the parish, the union, the district, being the only territorial divisions in our day.

Excavation has done but little for the earthworks of Wessex. Coarse pottery, with here and there an iron implement of very uncertain date, comprises nearly all that generally rewards the search of the archæologist. We must probably content ourselves with the knowledge which we possess at present. It is enough to shew us that our remote British ancestors were possessed of no mean degree of civilization; that they could construct works of gigantic and sometimes of complex design, and that they led lives of stirring enterprise and activity. But the want of a literature—the absence of a *vates sacer*—keeps us blind to the details which we should rejoice to recover.

While surveying the magnificent panorama of down-country visible from Barbury, or examining the quaint old banks themselves, perhaps the prevailing thought is one of regret that great remains like Silbury and Avebury, no less than these smaller ones, are for ever dumb: that we know more even of the siege of Troy than we do of the great battle of Badon, which once made Britain quake from end to end; that Stonehenge is little more to us than a splendid riddle, and *King Arthur* only the central figure in a grand but dim poetical group.

There were forty-eight persons present.

MEETING HELD MAY 11TH, 1866.

Geology.

C. A. HARRISON exhibited the following specimens:—A small shark's tooth found in the preceding week near Martinsell; some fish scales; *Pecten nitidus*. He also announced that more sharks' teeth had been found in the same locality.

Entomology.

A. MARSHALL read a short list of notices.

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Ornithology.

A. C. ALMACK exhibited the following eggs:—A spotted and unspotted Jackdaw's from the same nest, Little Bittern, Baillon's Crake, Avocet, Marsh Harrier, and Spotted Crake.

Botany.

The PRESIDENT read a list of notices, and compared them with those of last year. He also exhibited the following:—Mousetail (*Myosurus*), from Brimslade; a young Furze-bush; *Statice* from Teneriffe; Morella.

The paper was J. Pole's, on "Mosses," which was read by the President, owing to the author having left the College.

There were forty-one persons present.

MEETING HELD MAY 25, 1866.

Entomology.

A. MARSHALL read out a list of captures during the last fortnight, mentioning particularly the capture of *E. Anguinalis*, for the first time.

C. E. POWELL exhibited specimens of *M. Artemis*, *E. Anguinalis*, *P. Æ*nea, &c., taken during the present year.

Botany.

The PRESIDENT mentioned the discovery of *Cineraria Campestris* and *Montia Fontana*, hitherto unobserved here, and the discovery of *Myosurus Minimus* at Pewsey.

J. J. PULLEINE, ESQ. exhibited specimens of primroses, shewing the varieties leading to the so-called Oxlip, a species which only occurs in the eastern counties of England.

Geology.

C. A. HARRISON exhibited specimens of wood in chalk, *Pleurotomaria* (not *in situ*) in chalk; Scaphite from Martinsell; a fossil twice fossilized; Ventriculite in chalk; and iron Pyrites.

T. W. DAVIES exhibited specimens of Ammonite, &c.

Zoology.

H. W. HOCKIN exhibited a young turtle hatched on a homeward voyage from the West Indies.

The President spoke at some length upon "Palms," illustrating his remarks by numerous specimens lent by P. L. Simmonds, Esq., of London,

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exhibiting some of their uses, among them were sections of wood, "Penang Lawyer," various kinds of Leaves, a bunch of the Fruit of the Oil-Palm, Double Cocoa-nut from the Seychelles, Coquilla Nut, Vegetable Ivory, numerous specimens of the fibres: Cloths, Mats, Hats, Baskets, Cowry-Bags, Hammock, Palm-oil, Brooms, Partridge Cane, Coir Yarn, and Spoon.

There were fifty-one persons present.

MEETING HELD JUNE 8, 1866.

Ornithology.

A. C. ALMACK laid on the table the list of notices for May, and exhibited specimens of Eggs of the Stone-Curlew (taken by Soames), Buzzard (from his own collection), Nest and Eggs of Grasshopper Warbler, Wheatear, and Redpole (?), Egg of Coot, and varieties of those of Sparrow-hawk, Jack-daw, Magpie, Cuckoo, Tree-Pipit, Skylark, House-Sparrow, Willow-wren, Thrush (without spots), Redstart (with spots), Whinchat, monstrosities of those of the Partridge and Moorhen.

E. LLOYD exhibited two eggs of the Woodpecker.

Entomology.

Among the notices of the last month were *P. Alsus*, *M. Artemis*, *P. Bucephalas*, *N. Plantaginis*, *C. Porcellus*, *G. Trilinea*, *N. Lucina*, *S. Populi*, &c. Numerous captures had been made in the Micro-Lepidoptera, but were not ready for exhibition.

E. LLOYD exhibited specimens of the Pupa and perfect insect of the Cicada, from Italy.

G. K. MILLS exhibited a bred specimen of *S. Ligustri*.

Geology.

C. A. HARRISON exhibited specimens of Coral from the Flint. Ostrea, bored by a Teredo, from London clay; *Terebratula*, oxidised, *Pectunculus*, *Ammonites Millesius*, and *Natica*, from the Coral Rag.

Botany.

The PRESIDENT exhibited a specimen of the *Crepis Biennis*, discovered by R. R. P. Hilton, at Mildenhall. This is the first authentic instance of its discovery in this part of England.

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A. C. ALMACK read a paper on the

PLUMAGE OF BIRDS.

UNQUESTIONABLY the most beautiful as well as the most characteristic part of a bird is its covering of feathers, whether we regard the plumage of the eagle, so firm, so expansive and majestic, or that of the bird of paradise, with its gossamer-like tail, or the lovely humming bird glittering like the most brilliant gems. And surely it is some satisfaction to find that the symmetry and elegance of those feathers, and of the general form of the bird, though so very pleasing to the sight, are much more so when considered with regard to the habits and mode of living of their possessors, to which they are eminently subservient. Every part of their frame is formed for lightness and buoyance, and nothing could be more strikingly formed for this purpose than the light and delicate plumage with which their bodies are covered, so disposed as to protect them from the severest cold of the atmosphere; their wings are made of the lightest materials, and yet they strike the air with such force that the bird is propelled forward with astonishing rapidity.

But what, perhaps, contributes more to the ease with which birds fly than the lightness of feathers is the universal diffusion of air through their bodies. But perhaps I am rather hasty in asserting that such is the object of this diffusion of air, as it has been doubted by Mr. Hunter, owing to the fact that in the ostrich, which never rises from the ground, this conformation is also discovered. But on second thoughts it appeared to Mr. Hunter that this bird would require this diffusion to help it in running as much as others for their flight, by increasing its bulk and strength without adding materially to its weight.

Having now spoken of the general effect and object of feathers, let us examine them more minutely. In considering the clothing of a bird we may divide it into two parts, the down and the feathers proper. These two are in reality composed of the same substance, and so, chemically speaking, are even the beaks and claws, viz., coagulated albumen, which is nearly the same substance as that of which the hair and cuticle of all animals, and even the epidermis which covers living shells, is formed. This coagulated albumen, especially as we see it in the case of white of egg consolidated by heat, is better calculated to resist the action of water than almost any other flexible substance. This substance, especially in the upper or more coloured and glossy part of the feathers, is mixed with oils and metallic substances in very minute portions, which give it the colours the feathers assume; but in the down and light-coloured feathers it is nearly pure. The down lies on the under part of the clothing feathers: and also a small portion of almost all the feathers near the tube or barrel consists of down, which is also spread at

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intervals over the skin between the feathers. The chief purpose of the down seems to be that of warmth, as we find it increase in proportion as the bird is exposed to a cold temperature, especially in the Eider Duck. And when the bird remains all the year round in the same situation where there are great changes and differences of temperature we find that the down very much increases in thickness during the winter.

The form which the down assumes too, is often characteristic of the habits of the bird. In the ostrich, for instance, there is none, owing, I suppose, to its living in such a warm climate.

And now for the feather proper. Let us speak of a single feather first, and afterwards of their general arrangement over the body. All feathers have certain fixed and special characteristics, which are universally applicable, whatever may be the varieties of size, consistence, and colour. The various parts of a feather are the following:—the barrel or quill, which is the root part of the feather, up to where we find the vane or beard on both sides, when the centre part takes the name of shaft.

The quill, by which the feather is attached to the body, is an admirable specimen of lightness, combined with tenacity and firmness. On close examination we find a very small hole at the lower end, which leads into the cavity of the quill, in which we find a number of membranous pieces of conical shape, fitting closely into another. I need hardly draw the attention of such an assembly as this to remember the immense value that this part of the feather is to man.

The quill, as soon as we reach the beard, we find no longer to be round, but somewhat quadilateral, and, as I said before, is now called the shaft. There is not nearly so much hollow space in it as in the quill, but within a very horny case we find a great quantity of white substance, which is called the pith.

We now come to the *vane*, which is by far the most curious part of the feather, and at the same time the most useful to the bird, though totally useless to us. If we attempt to separate the barbs of a quill pen or any feather we find that they cling somewhat closely together, as if held to one another by hooks. This is exactly the case, for on looking closely with a tolerably good lens we see that the barbs are arranged with their flat faces toward one another, and that along the top of each barb there is a row of hooks sticking out on each side. These hooks are called barbules, and are arranged in such a manner that they interlace, and cannot easily be separated. This arrangement is also in a curious manner self-acting, as the moment after separation that they are brought together again, they interlock, and all is as firm as before.

1.—A feather may consist of a quill and shaft, without any other part.

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2.—A quill, shaft, and barbs destitute of barbules, as in the crest of the golden pheasant, and the feathers of the ostrich.

3 —A quill, shaft, barbs, and barbules.

4.—A quill, shaft, barbs, barbules, and barbicels, as in the ring-tailed eagle, albatross, and helmet hornbill.

The feathered race are supplied with a curious oiling apparatus, situated at the base of the tail, which, when spread over the feathers, renders them impervious to moisture.

Having now gone through the anatomy of a feather, let us consider for a moment the admirable way in which they are adapted to the habits and wants of a bird. Of course without this arrangement of hooks and barbs a web could hardly be formed of sufficient closeness of texture to resist the air in the use of the wings in flight.

The lightness of feathers has become proverbial, and no texture or substance of human fabrication can possibly be compared with them. It will hardly be believed that the entire plumage of a common owl frequently does not exceed an ounce-and-a-half in weight, and that the largest feathers of the mighty golden eagle do not exceed 1 drachm 5 grs. in weight, seven of them weighing not quite so much as a five shilling piece. Yet if we attempt to injure or break one of these feathers we shall find it fully as remarkable for its stiffness and tenacity as for its lightness, both of which qualifications are remarkably necessary for an apparatus formed for flight. Feathers, however, in point of compactness, differ greatly in different birds and in different parts of the same bird, of which we have a striking instance in the case of the tail of a peacock and its own wing, or that of any other bird; and I think that in general we shall find that the wing feathers fit much more compactly than those in the tail of almost all birds.

We now come to the names of the different feathers, and their arrangement on the body of a bird. The names of the feathers and their position are the following:—

1.—The *ear-covert*, which consists of certain soft feathers which cover the external organ of hearing. They vary much, and are used as a means of distinguishing many species. They are also known as the auriculars.

2.—The *scapulars*, which are the feathers which cover the part that answers to our shoulders, and the part above the elbows. They unite in colour to a great extent with the feathers on the back. They are of no use in flight, but as they are tolerably thick they afford a good covering for the wing joint, and are so arranged that they admit of easy motion in the wing.

3.—The next we come to are the feathers that go by the name of the *bastard wing*, so called from their resemblance to the feathers of the true wing. They grow from a small bone, which is united to the third joint of the wing,

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which answers to our wrist. This bone and these feathers are curiously increased in strength in proportion to the power of the bird's flight, The jer-falcon is given in books as the most signal instance of this, in which bird the development of this part, which corresponds to our hand, bears a most wonderful resemblance to it. In this bird the thumb consists of distinct bones, jointed together, and the four other fingers may be traced, the first in a long bone, the second in a shorter one, and the fourth in two ribs united by a thin blade. What use the bastard wing is put to we cannot well determine, but probably it prevents the wing from turning upwards.

4.—The *lesser wing-coverts* are the first feathers that appear on birds. There are generally several rows of them lying along the wing, and under-coverts answering to them underneath, which are more downy and colourless.

5.—The *greater wing-coverts*, which lie underneath the former, and reach a good way over the real wing feathers, and act as supports to them.

6.—We now come to the real wing feathers, which are the organs of flight. They are the strongest feathers on the whole bird. They rise from the third bone in the wing, which answers to our hand taken as a whole. There is a great deal of variation in the flight of birds owing to the different proportion these feathers have to one another. The first is not always largest. The form of wing with which a bird can turn with the greatest ease in the air is the second feather longer than the first, so that the first comes partially under it and supports it. This is the construction of wing we find in the case of all birds that take their food, as swallows, or their prey as hawks, on the wing. In pigeons also we find it the same, and in the lapwing the largest feather is farther in still.

There were forty persons present.

MEETING HELD JUNE 23, 1866.

Geology.

C. A. Harrison read the following report of the Geological Section during the half-year:—

You will, I am afraid, think our report somewhat meagre—and indeed, it could scarcely be otherwise. It would be easy to read you a list of the fossils found—in all more than 50—but this might perhaps be tedious, and would certainly be useless. When the Natural History Society proposed the formation of a Geological Section, it did not, we presume, intend to encourage

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merely a collecting mania. The mere collecting, whether of fossils, moths, or postage-stamps, may be a useful form of industry, exercise, or observation, but on no plea can it be considered a branch of science. What we believed the Society to desire was that we should try to shew wherein the value of fossils consists, by bringing their evidence to bear on the physical geology of the district, and on the changes which have taken place or are now taking place in the surface of the country about us.

But we have been at work too short a time—not three months—for success in this. Our facts, that is, our fossils, are too few for generalisations from them to be more than guesses, and occasionally, indeed, our uncertainty about the very nature of the fossils would render such guesses most rash and unscientific. One fact, however, seems tolerably clear. You remember that there are in England four lines of chalk hills. One rising in Dorsetshire, and extending, under the various names of Dorset Downs, Marlborough Downs, and Chiltern Hills, as far as the north-west point of Norfolk, and then, after being broken by the Wash, across Lincolnshire and part of Yorkshire to Flamborough Head. A second branches off from the Marlborough Downs, and with a slight break near Farnham, extends to Dover, under the name of North Downs. A third stretches from Dorsetshire, south of Salisbury, thence to Beachy Head, forming the South Downs, while a fourth, springing also from the Dorset centre, forms the Purbeck Downs, is broken by the sea, and again reappears as the central ridge of the Isle of Wight.

Apparently, then, we lie near the extreme west of the great chalk bed of England; and the first question we asked ourselves, as mere beginners, was whether the Marlborough Downs were really near land, whether continent or island, or were far out at the bottom of the cretaceous ocean in which the chalk was deposited. Now if they had been near the land it is quite clear that there must have been washed down to the floor of the ocean the ordinary materials of a sea-beach, and our chalk must have contained at all events sand, perhaps even water-worn pebbles. So far, however, is this from being the case, that the chalk even of the highest beds is singularly pure, and can be used equally well by the mathematician and the fives player for their respective boards. The fossils, too, are all unmistakeably marine—sharks' and fish teeth, scales of fish, chambered shells—such as the Ammonite—sea urchins, corals and sponges. And yet although so obviously at some distance from the shore, there must have been setting in this direction either a land current, or the course of a river before its waters were quite lost in the ocean, for in Rockley Quarry organic remains have been found, certainly not native to the sea-bottom, and which must have drifted from the land, viz., fossil wood and fossil bone, the latter apparently the bone of some *saurian*, decidedly not of a fish. In the same quarry, too, much of the chalk is covered with small

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black specks, traces of the mineral chlorite, also in all probability brought from land by some current.

Next half-year we hope to make out exactly which are the lower, which the upper, chalk beds in this neighbourhood, and work at other questions of the highest interest.

In conclusion, I must in the name of the section sincerely thank Mr. Mullins for the great interest he has taken in our proceedings, and without whom, I am sure, geology here would not have made much progress.

Botany.

The PRESIDENT mentioned a few of the more important notices obtained since the last meeting, and exhibited a specimen of the Bee Orchis (*O. Apifera*), found near Martinsell by A. Armstrong, Esq.

H. A. EVANS exhibited a remarkable species of *Aristolochia*, from the Oxford Botanical Gardens.

Entomology.

C. A. HILTON exhibited a remarkably small specimen of the Common Blue Butterfly (*P. Alexis*).

The PRESIDENT passed round a box of Moths, forming part of a donation from J. W. Dunning, Esq., to the College Collection. Among them were specimens of *S. Convolvuli*, *C. Elpenor*, *P. Interrogationis*, *P. Orichalcea*, *P. Festucæ*, *Bankia Bankiana*, &c.

Ornithology.

J. W. PARRINGTON exhibited a nest and eggs of the Tree Creeper.

A. C. ALMACK exhibited varieties of eggs of Jay and Common Wren.

The SECRETARY then gave a short summary of the proceedings of the Society during the past half-year:—

Total number of Exhibitions, including 12 collections...	154
Ditto last half	116
Average ditto per meeting.....	15·4
Ditto last half.....	14·4
Average number of persons present at the meetings ...	44
Ditto of visitors	25

A vote of thanks to F. C. LIGHTFOOT on his leaving the College was carried unanimously.

The PRESIDENT then congratulated the Society on its improved condition, and called attention to the fact that a new meeting-room was being fitted up for it by the College, and would probably be ready by the beginning of the next half-year. He also gave notice that there would be no tea after the meetings, and the money which had hitherto been devoted to that purpose would be

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spent in the purchase of Books for the new Library, which the Society must have, and of which the Books received this half-year would form a very good nucleus.

There were forty present.

BOTANICAL NOTICES.

CONSIDERING the small number of those who take any interest in the subject of Botany in the School, the amount of work done must be acknowledged to be very satisfactory. The number of notices is certainly not less than what it was last year, and this is more particularly remarkable, as the weather, as a whole, has been remarkably unsuited for Botanical work. It is hoped we shall soon be able to classify the different plants according to districts, and thus to see clearly how far we resemble and how far we differ from other localities of a similar geological formation. It has been remarkable how many chalk plants which *ought* to have been found here, have not yet been detected, and it was this fact more especially which has hitherto prevented our giving any table shewing these desiderata, because our materials are not even yet sufficiently complete. Absence from Marlborough during July and August is a great drawback, and this can only be remedied by the co-operation of residents in the neighbourhood, which at present we have not been able to secure.

The number of plants which we *might* have observed, but did not, is very small, and as a general rule satisfactory reasons can be given to account for the omissions. In most cases the plants appear not to have been in flower before the holidays, and therefore the scanty notices which have been recorded are not available for general results. On the other hand many additional localities for plants already recorded have been discovered, and at least twenty new species added to our list. It may be interesting to others as well as to Botanists to compare the "Floral Calendar" of this year with that of last.

The remarkably mild winter caused plants to sprout very early. At Christmas the gooseberry bushes were very forward, and early in February many trees and shrubs were budding rapidly: most of the early spring flowers, also, were above ground, and vegetation was, therefore, far in advance of what it is in ordinary years. About the middle of February a colder period set in, checking this unusual forwardness, and thereby doing a considerable amount of good. During the latter part of February and the whole of March the temperature was below the average, and but little progress was made in vegetation; but as the trees and shrubs were not too far advanced, no harm

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was done. With April came a slightly warmer period, and plants began to make a fresh start, and though the weather was very variable, still considerable progress was made.

But the month of May was particularly unfavourable to vegetation. It opened with very cold weather, and as soon as the temperature became warm enough for the leaves to expand, a very dry period set in, accompanied with strong easterly winds, so that in exposed situations the young leaves were torn to shreds, and the plants were unable to make much progress. The lilac was also greatly damaged, the wind and frosts killing many of the buds in the bunches, and thereby causing the trees, though in as full bloom as ever they would be, to present the blotched appearance which they assume when the flowers are passing off. Another very noticeable feature is the long time that elapsed between the first appearance of leaf buds and the time when the tree might be said to be in full leaf, affording in this particular a marked contrast to what occurred last year: from this circumstance, also, *locality* made a great difference in the time when plants were in perfection, some trees being even weeks in advance of others of the same species, merely from being less exposed. The district in the immediate neighbourhood of Marlborough, however, appears to be far more backward than those a few miles off.

The month of June was very favourable though the country was not really green till after the first week had passed. Since then plants have come rapidly into flower, but vegetation is rather backward when compared with other years.

Unless mentioned to the contrary, the dates given are those of the times of first flowering, "By" is added when the plant appeared to have been in flower a few days. An asterisk (*) indicates that the specimen observed was a cultivated one.

Names in Capital Letters indicate that the plants have not hitherto been recorded as occurring near Marlborough; those in italics, that they have been observed in new localities.

Names of those whose initials are given in the following list:—

M. O. A.....	M. O. Alison.
A. C. A.	A. C. Almack.
A. A.	A. Armstrong, Esq.
H. R. A.....	H. R. Armstrong.
F. F. B.....	F. F. Back
C. M. B.....	C. M. Bevan.
H. C. B..... ..	H. C. Blaker.
W. E. B.	W. E. Bolland.

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J. H. C.	J. H. Calley.
L. C. C.	L. C. Calley.
W. R. C.	W. R. Carles.
E. H. C.	E. H. Carr.
C. J. C.	C. J. Cole.
E. H. D.	E. H. Davis.
W. W. D.	W. W. Dayman.
H. A. E.	H. A. Evans.
R. B. F.	R. B. Forrester.
E. F.	E. Freeman.
C. E. G.	C. E. Green.
C. A. H.	C. A. Harrison.
A. H.	A. Herklots.
G. A. H.	G. A. Hight.
J. E. H.	J. E. Hilliard.
H. M. H.	H. M. Hilton.
R. R. P. H.	R. R. P. Hilton.
A. P. H.	A. P. Hockin.
H. W. H.	H. W. Hockin.
G. H.	G. Holden.
A. G. H.	A. G. Hunter.
R. F. I.	R. F. Isaacson.
F. J. H. J.	F. J. H. Jenkinson.
J. H. J.	J. H. Johnson.
E. A. K.	E. A. King.
T. L.	T. Lister.
E. L.	E. Lloyd.
H. W L.	H. W. Lyall.
T. E. M.	T. E. Maclean.
R. B. M.	R. B. Mainwaring.
A. M.	A. Marshall.
H. A. M.	H. A. Marsh.
J. M.	J. Martley.
W. G. N.	W. G. North.
J. C. P.	J. C. Palmer.
J. W. P.	J. W. Parrington.
H. R. P.	H. R. Parrington.
J. P.	J. Pole.
T. A. P.	Rev. T. A. Preston.
J. J. P.	J. J. Pulleine, Esq.
A. H. B. R.	A. H. B. Reynardson.

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S. A. R. ..... S. A. Rogers.
G. F. R. ..... G. F. Ruck.
H. S. S. ..... H. S. Sankey.
F. J. H. S. ..... F. J. H. Somerset.
H. T. S. ..... H. T. Stainton, Esq., Mountsfield, Lewisham.
E. F. S. ..... E. F. Stearns.
P. T..... P. Thursby.

JANUARY AND FEBRUARY.

The remarkably mild winter caused the plants to sprout very early. At Christmas the gooseberry bushes were very forward, and early in February many trees and shrubs were budding rapidly; most of the early spring flowers also were above ground at that time.

Ranunculus Ficaria ... Celandine, Feb. 10.
* Eranthys hyemalis ... Aconite, nearly over Feb. 10.
* Cheiranthus Cheiri ... Wall-flower, Feb. 10, not generally out till April.
Cardamine hirsuta ... Hairy Bitter Cress, flower and seed, Feb. 10, *A.M.*
Brassica Rapa ... ... Turnip, Feb. 17, *H.W.H.* (not general).
Sinapis arvensis ... Charlock, last year's plants in bud, Feb. 21, *F.F.B.*
Viola Odorata ... ... Sweet Violet (wild) Feb. 28, *E.L.*
(cultivated) Feb. 28, *F. F. B.*
Stellaria media ... ... Chickweed, Feb. 18, *J.P.*
Ulex Europæus ... ... Furze, in flower Feb. 25, *T.E.M.*
* Prunus Lauro-cerasus ... Laurel, flower-buds far advanced Feb. 20.
Potentilla fragariastrum Barren Strawberry, Feb. 17, *P.T.*, not generally in flower till about three weeks later.
* Pyrus Japonica ... ... Feb. 10.
* Ribes Grossularia ... Gooseberry, fully formed leaves Feb 26.
* R. Sanguinea ... ... Scarlet Ribes, leaf buds bursting Feb. 21, *F.F.B.*
Pimpinella Saxifraga ... Small Burnet Saxifrage, bud Feb. 21, *T.E.M.* and *P.T.*
Sambucus nigra... ... Elder, buds well formed Feb. 24, *F.F.B.*
* Viburnum Laurustinus... Laurustinus, just in flower Feb. 10.
Lonicera Periclymenum Honeysuckle, leaves, Feb. 16, *F. J. H. S.*

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Tussilago Farfara ...	Coltsfoot, Feb. 23, *T. E. M.* and *P. T.*
Bellis perennis	Daisy, Feb. 18, *J. P.*
Senecio vulgaris... ...	Groundsel, in flower all the year.
Leontodon Taraxacum ...	Dandelion, Feb. 17, *T. E. M.*
Veronica agrestis ...	Field Speedwell, flower and seed, Feb. 17, *T. E. M.*
V. Buxbaumii	Buxbaum's Speedwell, February 21, *P. T.* and *T. E. M.*
V. Hederifolia	Ivy-leaved Speedwell, February 20, *F. F. B.*
Lamium Purpureum ...	Red Dead-nettle, in flower all the year.
L. album	White Dead-nettle, February 26 (from last year's branches) *R. R. P. H.*
Mercurialis Perennis ...	Dog's Mercury, barren flowers Feb. 18, *J. P.* fertile „ Feb. 26, *J C P.* not in full bloom till end of March.
Salix Caprea	Great Sallow, catkins bursting February 17, *P. T.*; stamens appearing February 26, *J. M.*; not out by March 1.
Corylus Avellana ...	Hazel, fertile flower, February 21, *M. O. A.*
Taxus baccata	Yew, barren flower, February 21.
* Narcissus Pseudo-narcissus	Daffodil, one specimen in a very warm garden in flower by February 8. No further specimen observed before the end of February. Garden specimens in full bud by March 1.
Crocus sp.	Full flower Feb. 10; in perfection as late as March 17.
Galanthus nivalis ...	Snowdop, in flower during January and February.
* Scilla Bifolia	Twin-leaved Squill, February 10; lasted till nearly the end of March.
* S. Sibirica	Siberian Squill, February 10, lasted till nearly the end of March.

MARCH.

Anemone nemorosa ...	Wood Anemone, March 18, *A. M.*
Ranunculus heterophyllus	Water Crowfoot, full flower March 25, at Lockeridge, *W. G. N.*; not observed near Marlborough till April 18.
R. repens...	Creeping Crowfoot, March 17, *M. O. A.* (not generally out till May.)

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Caltha palustris	Marsh Marigold, March 21, *P. l.* and *L. C. C.*
Helleborus fœtidus ..	Stinking Helleborc, by March 24, *E. H. D.*
* Berberis fascicularis ...	March 18, *R. R. P. H.*
* Corydalis solida	Solid-rooted Corydal, March 29.
Draba verna	Whitlow-grass, flower and seed, March 10, *P. T.*, not general till about a week later.
* D. aizoides	Just in flower March 17.
Viola hirta	Hairy Violet, March 23, *A. M.*
Prunus communis	
(*Var. a*) spinosa ...	Sloe, fully formed leaves March 6, *A. P. H.*
(*Var. b*) insititia ...	Bullace, flower March 28, *A. H.* and *E. F.*; flower and leaf March 30, *R.R.P.H.*
Alchemilla arvensis ...	Parsley Piert, March 17, *M. O. A.*
	Peach, in warm garden, March 21.
	Apricot, ditto March 31.
* Ribes Grossularia ...	Gooseberry, some in full leaf March 17, *R. R. P. H.*
* R. Sanguinea	Scarlet Ribes, young leaves, March 21, *R.R.P.H.*
Adoxa Moschatellina ...	Moschatel, March 30, *W.G.N.*
Sambucus nigra	Elder, fully formed leaves March 11, *J. H. C.* and *L. C. C.*
Petasites vulgaris ...	Butter-bur, March 9, *J. W. P.*
* Syringa vulgaris... ...	Lilac, leaf-buds open March 21, *W. W. D.*
Vinca minor	Lesser Periwinkle, by March 3, *W.E.B.*
Lathræa Squamaria ...	Toothwort, March 30, *L. C. C.*
Veronica polita	Grey Field Speedwell, March 30, *R. B. M.*
Nepeta Glechoma ...	Ground Ivy, March 24, *P. T.*
Buxus sempervirens ...	Box, March 25, *J. J. P.*
Urtica urens	Small Nettle, March 10.
Ulmus montana	Wych Elm, March 3, lasted all the month.
Salix Caprea	Great Sallow, fertile catkins, May 11, *A.H.B.R.*
Narcissus Pseudo-narcissus	Daffodil, specimen seen as early as March 6, by *R. R. P. H.*; in flower March 11, *H. W. L.*
Arum maculatum ...	Cuckoo-pint, young spathes, March 4, *J. W. P.*
Poa Annua	Annual Meadow-Grass, March 3, *P. T.*; very few flowers out in March.

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APRIL.

* Anemone Apennina ...	Blue Anemone, April 1.
Ranunculus heterophyllus	Water Crowfoot, April 18, near Marlborough, *A. H. B. R.*; March 26, at Lockeridge.
R. Peltatus	In full flower by May 1, *A. P. H.*
R. Drouettii	In full flower by April 24, *R. R. P. H.*
R. Auricomus	Goldilocks, April 16, *P. T.*
R. Bulbosus	Buttercups, April 17, *G. F. R.*, not generally in flower till April 25.
Helleborus Viridis ...	Green Hellebore, full flowered, Ogbourn copse, April 18, *A. H. B. R.*
Fumaria Officinalis ...	Fumitory, April 26, *H.R.P.*
* Dielytra Spectabilis ...	Bleeding Heart, April 26.
* Cheiranthus Cheiri ...	Wallflower, about April 10.
Arabis hirsuta	Hairy Rock Cress, April 12, *R. R. P. H.*
Cardamine pratensis ...	Cuckoo-flower, April 22, *W. R. C.*
Sisymbrium Thalianum	Thale Cress, April 12, *R. R. P. H.*
Alliaria officinalis ...	Sauce Alone, April 23, *A. P. H.*
Brassica Rapa	Turnip, full flower April 12, *P. T.* and *L. C. C.*
* B. oleracea	Cabbage, in bud April 12, *R. R. P. H.*
* Lunaria biennis ...	Honesty, April 13.
Sinapis arvensis ...	Charlock, by April 28, *A. H. B. R.*
Lepidium campestre ...	Pepper-wort, in bud April 30, *R. R. P. H.*
Capsella Bursa-pastoris	Shepherd's Purse, April 16, *R. R. P. H.*
Viola sylvatica both varieties)	Wood Violet, April 11, *R. R. P. H.*
V. tricolor ... ... (*Var.*) arvensis ...	Heartsease, April 17, *G. F. R.*
Arenaria trinervis ...	Three-nerved Sandwort, April 30, *R. R. P. H.*
Stellaria Holostea ...	Stitchwort, April 12, *R.R.P.H.*
Cerastium glomeratum ...	Broad-leaved Mouse-ear, April 16, *A. H. B. R.*
Tilia Europæa... ...	Lime Tree, leaves April 27, *C. M. B.*; trees not green by April 30.
Acer campestre ...	Maple, young leaves April 27, *G. F. R.*
A. Pseudo-platanus ...	Sycamore, in bud April 30, *R. R. P. H.*
Æsculus Hippocastanum	Horse Chestnut, trees green April 22.
Geranium molle ...	Dove's-foot Crane's-bill, April 28, *P. T.* and *T. E. M.*
G. Lucidum	Shining Crane's-bill, April 28, *P. T.* and *T. E. M.*
G. Robertianum ...	Herb Robert, April 30, *R. R. P. H.*

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Oxalis Acetosella ...	Wood Sorrel, full flower April 23, *J. J. P.*
Euonymus Europœus ...	Spindle, bushes green April 25.
Trifolium pratense ...	Purple Clover, April 30, *G. F. R.*
Vicia sepium	Bush Vetch, April 27, *R. R. P. H.*
Lathyrus macrorhizus	Tuberous Vetch, April 24, *A. P. H.*
Prunus communis (*Var.*) spinosa ...	Sloe, April 8, *G. F. R.*
P. Avium	Wild Cherry, leaf April 17, *R. B. F.*; flower, April 18 (not general) *H. S. S.* Occurs at Rabley, Dead Man's Copse, Wan's Dyke, Brimslade.
Fragaria vesca	Strawberry, April 25, *J.J.P.*
F. Elatior	Hautboy Strawberry, April 30, near Martinsell *R. R. P. H.*
Geum Rivale	Water Avens, April 1.
Cratægus Oxyacantha ...	Hawthorn, leaf April 5, *C. J. C.*; hedges not universally green by April 30.
	Pear, flower in warm garden April 20.
	Apple, flower in warm garden April 27.
	Plum, flower in warm garden April 1.
* Ribes Grossularia ...	Gooseberry, April 1, *G. F. R.*
* R. rubrum	Red Currant, April 14, *T.L.*; April 9 in a warm garden.
* R. Sanguinea	Scarlet Ribes, April 1 (in a warm spot), generally in flower about a week later.
* R. aureum	Golden Ribes, by April 18.
Saxifraga tridactylites ...	Rue-leaved Saxifrage, April 12, *R. R. P. H.*
S. granulata	Meadow Saxifrage, April 25, *R. R. P. H.*; not generally in flower till a fortnight later.
Anthriscus sylvestris ...	Wild Chervil, April 18, *W. W. D.*
Sambucus nigra... ...	Elder, full leaf April 1, *L. C. C.*
Viburnum lantana ...	Mealy Guelder-Rose, buds bursting April 22, *E. F. S.*; buds nearly out by April 30.
V. opulus...	Guelder-Rose, leaf and flower buds, April 30, *R. R. P. H.*
V. Laurustinus	Just in flower February 10, not in full flower by April 30.
Galium cruciatum ...	Crosswort, April 27, *A. P. H.*
Valeriana dioica... ...	Marsh Valerian, coloured buds, April 25, *A. H.*
Valerianella olitoria ...	Corn Salad, April 27.

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Leontodon Taraxacum (*Var.* b)	April 2, at Savernake.
(*Var.* c)	April 8, *G. F. R.* (generally distributed on the Downs).
* Doronicum Pardalianches	Leopard's Bane, just out April 28.
Ligustrum vulgare ...	Privet, bushes green April 25.
Fraxinus excelsior ...	Ash, a few in flower by April 25.
* Syringa vulgaris ...	Lilac, coloured buds by April 30.
Vinca major	Greater Periwinkle, April 15, *R. R. P. H.*
Gentiana acaulis ...	About April 3, full flower April 27.
Pulmonaria officinalis ...	Lungwort, April 8, *M. O. A.*
Symphytum officinale ...	Comfrey, just coming into flower April 28, *G. F. R.*
Lithospermum arvense ...	Corn Gromwell, April 20 (not generally in flower).
Myosotis Arvensis ...	Field Scorpion Grass, April 16.
M. Collina	Early ditto, by April 23, *J. J. P.*; found in field near College by *J. H. J.*; near Martinsell by *R. R. P. H.*; and on Marlborough Downs by *J. J. P.*
Linaria Cymbalaria ...	Ivy-leaved Toad-flax, April 26.
* Scrophularia vernalis ...	Yellow Figwort, April 1.
Pedicularis sylvatica ...	Red Rattle, April 30, *H. R. P.*
Veronica Chamædrys ...	Germander Speedwell, April 28, *H. B. F. R.*
Lamium amplexicaule ...	Henbit, April 28, *A. H. B. R.*
L. album	White Dead Nettle, April 1, *G. F. R.*
L Galeobdolon	Archangel, April 30, *R. R. P. H.*
* L. Maculatum	Spotted Dead-Nettle, coming well into flower April 1.
Ballota fœtida	Stinking Horehound, in bud April 30, *T. E. M.*
Ajuga reptans	Bugle, coloured buds April 30, *A. H.* and *E. F.*
Primula vulgaris... ...	Primrose, a few in flower at Christmas, not generally in flower till April.
P. veris	Cowslip, April 5, *Mrs. Blake*, not generally out till about a fortnight later.
Plantago lanceolata ...	Ribwort, April 23, *B. R. P. H.*
* Asarum Europæum ...	Asarabacca, April 1.
Rumex Acetosa	Sorrel, April 30, *R. R. P. H.*
Euphorbia amygdaloides	Wood Spurge, April 30, *R. R. P. H.*
Ulmus suberosa	Common Elm, hedges of it green in warm spots, trees not green by end of April.

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U. Montana	Wych Elm, trees not green by end of April.
Salix Caprea	Great Sallow, full-sized leaves about April 22.
POPULUS ALBA	White Poplar, young leaves near Martinsell and at Lockeridge, April 30, *R. R. P. H.*
Betula glutinosa... ...	Birch, trees green April 25.
Fagus sylvatica	Beech, a few trees in very favoured spots green by April 24; not generally in leaf by April 30. Barren catkins in bud April 27, *J. W. P.*
Quercus Robur	Oak, generally leafless by April 30.
Corylus Avellana ...	Hazel, a few young leaves April 2, *R. R. P. H.* buds bursting April 14, T. *L.*; fertile flowers still out April 14, *G. F. R.*; bushes not green by April 30.
Juglans regia	Walnut, young leaves with unopened barren catkins, May 1, *A. M.*
Larix Europæa	Larch, cones open by April 1; trees green April 25.
Orchis mascula	Early Purple Orchis, April 24, *M.O.A.*
* Leucojum Æstivum ...	Summer Snow-flake, April 10.
Polygonatum multiflorum	Solomon's Seal, full bud April 30, *E. L.*
Tulipa sylvestris... ...	Tulip, cultivated specimens in flower about April 18; wild specimens in full flower April 23, *J. J. P.*
* Fritillaria meleagris ...	Snake's Head, about April 3.
* F. imperialis	Crown Imperial, about April 10.
Endymion nutans ...	Blue-bell, one specimen in flower March 30, *H. C. B.*; next flower observed April 13, *E. F. S.*; not in full perfection by end of April
* Muscari racemosum ...	Grape Hyacinth, April 1.
Luzula pilosa	Hairy Wood-rush, April 4, *H. A. E.*
L. campestris	Field Wood-rush, April 30, *R. R. P. H.* and *T. E. M.*
Arum maculatum ...	Cuckoo-pint, spathes open April 19, *A. G. H.*
Carex præcox	Vernal Sedge, April 22, *G. F. R.* (very abundant.)
C. paludosa	River Sedge, April 21, *W. R. C.* and *R. F. J.*
C. riparia...	Great River Sedge, April 13.
Anthoxanthum odoratum	Sweet Vernal-grass, panicles Ap 30, *R. R. P. H.*

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Alopecurus pratensis ... Fox-tail Grass, panicle April 15, *G. F. R.*

Melica uniflora ... .. Melic, April 27, *G. F. R.*

Equisetum arvense ... Corn Horsetail, April 21, *R. F. J.*

Lastrea Filix-mas ... Male Fern, fronds one foot high, April 30, *H. R. P.*

Asplenium Ruta-muraria Wall Rue, young fronds, April 19, *A. M.*

Pteris aquilina ... ... Brakes, fronds six inches high, April 30, *H. R. P.*

Botrychium Lunaria ... Moonwort, young fronds (unopened) May 2, *H. R. P.* and *J. H. J.*

Ophioglossum vulgatum Adder's-tongue, young fronds April 28, *P. T.* and *T. E. M.*

MAY.

Myosurus minimus ... Mousetail, May 5, at Brimslade, *T. A. P.*; in seed May 15, at Pewsey, *J. H. J.* and *J. E. H.*

Ranunculus flammula ... Spearwort, May 9, at Great Bedwyn (in flower) *J. J. P.* Found also at Brimslade (not in flower) *T. A. P.*

R. acris ... ... Upright Crowfoot, May 9, at Bedwyn, *T. A. P.*; a few days later at Marlborough.

R. repens ... ... Creeping Crowfoot, by May 3, *R. R. P. H.*; fairly out by May 9.

R. arvensis ... ... Corn Crowfoot, May 23, *R. R. P. H.*

* R. gramineus ... ... Grassy Crowfoot, May 12.

* Aquilegia vulgaris ... Columbine, about May 12.

* Trollius Europæus ... Globe Flower, May 22.

BERBERIS VULGARIS ... Barberry, in bud May 13, in a hedge at Clatford, *G. F. R.*

Papaver Rhœas ... ... Red Poppy, May 30, *J. C. P.*

P. dubium ... ... Smooth Long-headed Poppy, May 27, *M. O. A.*

Chelidonium majus ... Celandine May 1.

* Meconopsis Cambrica ... Yellow Poppy, May 7.

Barbarea vulgaris ... Yellow Rocket, May 16.

* Isatis Tinctoria ... ... Woad, May 7.

* Alyssum ... ... Yellow Alyssum, by May 1.

Cardamine sylvatica ... Flower and seed (Brimslade) May 5. *T. A. P.* Found also at Bedwyn by *J. J. P.*

Raphanus Raphanistrum Jointed Charlock, May 29, *R. R. P. H.*

Helianthemum vulgare ... Rock Rose, May 22, *R. R. P. H.*

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Polygala vulgaris ...	Milkwort, May 7, *C. A. H.*, &c.
Silene Inflata	Bladder Campion, buds May 23, *R. R. P. H.*
Lychnis Vespertina ...	White Campion, coloured buds May 27, *R. R. P. H.*; flower May 28.
L. diurna	Red Campion, May 8, *A. H.*
Arenaria Serpyllifolia . .	Thyme-leaved Sandwort, May 26, *J. J. P.*
Stellaria uliginosa ...	Water Chickweed—Brimslade and Bedwyn—about May 16.
* Cerastium arvense ...	Field Chickweed, May 16.
C. Triviale	Mouse-ear Chickweed, May 21, *J. J. P.* (probably much earlier.)
* Tilia Europæa	Lime, trees green May 19; bud June 3, *T.E.M.*
Acer Campestre ...	Maple, flower May 6, *G. F. R.*, leaves not fully out May 21.
A. Pseudo-platanus ...	Sycamore, trees not green May 25, flower May 13, *M. O. A.*
* Staphylea pinnata ...	Bladder-nut, May 8.
Æsculus Hippocastanum	Horse Chestnut, in flower in the Forest, May 5, *J. W. P.*, in flower May 13, lasted all the month.
* Geranium Phæum ...	Dusky Geranium, by May 15, *R. R. P. H.*, cultivated specimen in flower May 12.
G. dissectum ...	Dove's Foot, May 29, *R. R. P. H.*
G. rotundifolium ...	In flower May 12.
G. Sylvaticum... ...	Wood Crane's-bill, by May 31.
Euonymus Europæus ...	Spindle, May 29, *R. R. P. H.*
Sarothamnus Scoparius...	Broom, in full flower May 5.
* Cytisus Laburnum ...	Laburnum, one in flower May 15, some trees not in flower by May 31, though generally in flower by that time.
Medicago lupulina ...	Black Medick, May 1.
* Trifolium Ochroleucum...	Scarlet Clover, May 23, *R. R. P. H.*
T. repens	Dutch Clover, May 23, *R. R. P. H.*
T. minus	Lesser Hop Trefoil, Savernake Forest, May 23, *W. W. D.*; Marlborough Downs, *J. J. P.*
Lotus corniculatus ...	Bird's-foot Trefoil, May 28, *J. J. P.*
L. Major	Greater ditto, Bedwyn, *J. J. P.*, not in flower May 28.
Anthyllis Vulneraria ...	Lady's Fingers, May 21, *J. J. P.* and *T. E. M.*

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Vicia Sativa	Common Vetch, May 26, *J. J. P.*; found near Martinsell by *T. E. M.*; and in the copse near Rockley, by *J. J. P.*
V. tetrasperma	Smooth Tare, Ogbourne Long Copse, May 29, *J. J. P.* and *W. R. C.*; found also on the hedge bank of the Cricket Field, by *R. R. P. H.*
Hippocrepis comosa ...	Horse-shoe Vetch, May 29, *J. W. P.* and *E. H. C.*; found at Rockley by *T. E. M.*, and on White Horse Down.
Onobrychis sativa ...	Cock's-head, May 28, *A. P. H.*
* Prunus Lauro-cerasus ...	Laurel, full flower May 16, *G. F. B.*
* Sibbaldia procumbens ...	May 16.
Sanguisorba officinalis ...	Great Burnet, just in flower May 13, *W. G. N.*
Poterium Sanguisorba ...	Salad Burnet, May 3, *R. R. P. H.*
Alchemilla vulgaris ...	Lady's Mantle, May 5, *J. H. J.* and *J. E. H.*
Potentilla anserina ...	Silver-weed, May 21, *J. J. P.* and *T. E. M.*
P. Tormentilla	Tormentil, May 9, *J. J. P.*
Geum urbanum	Wood Avens, by May 4, in a warm locality; May 22, *R. R. P. H.*
Cratægus Oxyacantha ...	Hawthorn, first flower May 14, *J. E. H.* and *J. H. J.*; fully out May 31.
* Amygdalus communis ...	Sweet Almond, flower in warm garden May 10.
Pyrus Malus (acerba) ...	Crab Tree, May 7, *R. R. P. H.*
(tomentosa) ...	Full flower, May 11, *R. R. P. H.*
* P. Aucuparia	Mountain Ash, full flower May 20.
MONTIA FONTANA ...	Water Blinks, Savernake Forest, in seed May 23, *W. W. D.*
Spergula arvensis ...	Corn Spurrey, flower and seed, May 15, *J. H. J.* and *J. E. H.*
Scleranthus annuus ...	Knapwell, May 15, *J. H. J.* and *J. E. H.*
Sedum Telephium ...	Orpine, near Martinsell, *W. W. D.*
S. ANGLICUM	English Stonecrop, Devil's Den, *G. F. R.* (probably this species.)
S. REFLEXUM	Yellow Stonecrop, near the "Ailesbury Arms," at Clatford, *H. A. E.*
* S. Rhodiola	Rose-Root, May 7.
* Saxifraga umbrosa ...	May 8.
* S. Geum	May 7.
Sanicula Europæa ...	Sanicle, May 7, *R. R. P. H.*
Bunium flexuosum ...	Pignut, May 22, *R. R. P. H.*

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HYDROCOTYLE VULGARIS...	Marsh Penny, Bedwyn, *J. J. P.* (not in flower) May 9.
Pastinaca sativa... ...	Parsnep, full bud May 13, *W. G. N.*
Daucus Carota	Carrot, just in flower May 26, *R. R. P. H.*
Scandix Pecten-veneris...	Shepherd's Needle, May 9, *R. R. P. H.*
Cornus Sanguinea ...	Dogwood, coloured buds May 21.
Viburnum lantana ...	Mealy Guelder Rose, May 5, *J. H. J.* and *J. E. H.*, not generally out till about three weeks later.
V. opulus...	Guelder Rose, cultivated specimens nearly out May 27, *G. F. R.*
* Lonicera Caprifolium ...	Honeysuckle, May 20, *R. R. P. H.*
Sherardia arvensis ...	Blue Sherardia, May 4, *R. R. P. H.*
Asperula odorata ...	Woodruff, cultivated, May 7; wild, May 10, *T. E. M.*
Galium aparine	Cleavers, May 10, *J. H. J.* and *J. E. H.*
Valeriana dioica	Marsh Valerian, May 8, *R. F. I.* and *W. R. C.*
* Centranthus ruber ...	Spur Valerian, May 23.
Dipsacus sylvestris ...	Teasel, Polton (not in flower) *J. J. P.*
Eupatorium Cannabinu n	Hemp Agrimony, Roundhill Copse, (not in flower) *J. J. P.* and *W. R. C.*
Chrysanthemum Leucanthemum	Ox-eye, May 20, *A. C. A.*
Matricaria inodora ...	Corn Chamomile, just in flower May 20, *P. T.*
SENECIO CAMPESTRIS ...	Fleawort, in bud (Rabley Down), May 21, *T. E. M.*
Carduus crispus	Welted Thistle, May 21, *T. E. M.*
Apargia hispida	Hawkbit, May 29, *R. R. P. H.*
* Tragopogon porrifolius ...	Purple Goat's-beard, May 22.
Sonchus oleraceus ...	Sowthistle, May 29, *A. M.*
S. asper	Sowthistle, May 29, *A. M.*; *R. R. P. H.*
* Doronicum Pardalianches	Leopard's-bane, May 2.
CREPIS BIENNIS	Rough Hawk's-beard, by May 28, *R. R. P. H.*
Hieracium Pilosella ...	Creeping Mouse-ear, May 22, *J. C P.*
* Rhododendron sp. ...	by May 20.
Ilex Aquifolium	Holly, full flower May 24.
Fraxinus excelsior ...	Ash, leaf buds bursting May 13; trees green May 31.
* Syringa vulgaris... ...	Lilac, flower May 7 (over June 9.)
Symphytum officinale ...	Comfrey, not generally out till about May 13.

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Myosotis versicolor ...	Yellow and blue Scorpion Grass, flower and seed, May 22, at Lockeridge, *R. R. P. H.* Found also near Martinsell by *H. T. S.*
Scrophularia nodosa ...	Knotted Figwort, May 29, *Mrs. Blake.*
Melampyrum pratense ...	Cow-wheat, May 26, *R. R. P. H.*
Rhinanthus Crista-galli...	Yellow Rattle, May 26, *R. R. P. H.*
Veronica Serpyllifolia ...	Thyme-leaved Speedwell, May 7, *R. R. P. H.*
V. arvensis	Wall Speedwell, May 15, *A. H. B. R.*
• Salvia Verbenaca ...	Clary, bud May 16; in flower shortly after.
TEUCRIUM SCORODONIA ...	Wood Sage, hedge near Sergeant Doole's, *T. A. P.*
Ajuga reptans	Bugle, May 5, *J. H. J.* and *J. E. H.*
Anagallis arvensis ...	Pimpernel, May 23, *R. R. P. H.*
Chenopodium Bonus-Henricus	All-good, May 6, *P. T.* and *L. C. C.*
Rumex Acetosella ...	Sheep's Sorrel, May 26, *R. R. P. H.*
Thesium humifusum ...	Bastard Toad-flax, Downs near Rabley, *J. J. P.*
Urtica Dioica	Stinging Nettle; May 15, *R. R. P. H.*
Ulmus suberosa	Common Elm, trees tinted May 10; full leaf May 22.
U. montana	Wych Elm, trees not green till May 31.
Betula glutinosa... ...	Birch, fertile catkins, May 2, *R. R. P. H.*; barren catkins, May 5, *G. F. R.*
Fagus Sylvatica	Beech, barren catkins, May 4, *G. F. R.*; fertile ditto May 7, *J. H. J.* and *J. E. H.* Trees generally green May 13.
Quercus robur	Oak, young leaves and barren catkins May 2, *A. P. H.*, generally in leaf by May 31.
• *Carpinus Betulus* ...	Hornbeam, male catkins over by May 7. This plant is generally distributed.
• Pinus sylvestris	Scotch Fir, barren flower May 9; young cones May 21, *G. F. R.*
• Paris Quadrifolia ...	Herb Paris, May 2.
Orchis Morio	Green-winged Orchis, May 5.
O. mascula	Early Purple Orchis, white varieties found May 8, at Martinsell, by *C. A. H.*; and at Rabley, May 11, by *T. E. M.*
O. ustulata	Dwarf Orchis, May 29, *E. H. C.* and *J. W. P.*
Listera ovata	Twayblade, May 21, *J. J. P.*
Neottia Nidus-avis ...	Bird's-nest, May 29, *S. A. R.*

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Cephalanthera grandiflora	Helleborine, young plants, probably of this species, were found in Roundhill copse by *J. J. P.* and *W. R. C.*
* Iris Germanica ...	German Iris, May 22, *R. R. P. H.*
* Ornithogalum umbellatum	Star of Bethlehem, May 7.
* Convallaria majalis ...	Lily of the Valley, as early as May 10, not generally in flower till about 10 days later.
* Allium molle ...	May 12.
POTAMOGETON LUCENS ...	Shining Pondweed, in the canal at Savernake.
P. PECTINATUS ...	Canal near Savernake (probably this species.)
Carex vulpina ...	Great Rough Sedge, May 9.
C. glauca	Glaucous Sedge, May 5.
C. sylvatica	Wood Sedge, May 9, *R. R. P. H.*
* C. pendula	Pendulous Sedge, May 8.
C. PULICARIS	Flea Sedge, Bedwyn Common, May 9, *J. J. P.* (probably this species).
Alopecurus geniculatus ...	Floating Foxtail Grass, May 29, *J. J. P.*
Milium effusum	Millet, panicles appearing May 10, *T. E. M.*
Poa trivialis	Rough Meadow-grass, panicles May 8, *J. H. J.* and *J. E. H.*
P. pratensis	Common Meadow-grass, panicles May 6, *G. F. R.*
Dactylis glomerata ...	Cock's-foot grass, May 15, *G. F. R.*
Festuca ovina	Sheep's Fescue-grass, May 15.
Serrafalcus mollis ...	Lop-grass, May 9.
Lolium perenne ...	Rye-grass, May 4, *G. F. R.*
	Barley, ear May 10.
	Rye, ear May 15, *J. H. J.*
Equisetum arvense ...	Corn Horse-tail, barren fronds, May 13, *A. M.*
Botrychium lunaria ...	Moonwort, young fronds May 2, *H. R. P.* Found also at Bedwyn by *J. J. P.*; near Martinsell, by *T. E. M.*; and in the glade beyond the grand avenue by *G. H.*
Ophioglossum vulgatum ...	Adder's Tongue, April 23, *P. T.* and *T. E. M.* Found in many spots in the Forest; near Sergeant Doole's; and on Aldbourne Downs, by *J. J. P.*; and near the Eight Walks by *P. T.*

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JUNE.

Papaver Argemone ...	Long Prickly-headed Poppy, by June 13, *T. E. M.*
P. Lecoqii...	Waste Ground, Marlborough College, June 14, *R. R. P. H.*
Nasturtium officinale ...	Water Cress, June 6, *A. M.*
Sisymbrium officinale ...	Hedge Mustard, June 10, *A. H. B. R.*
Reseda lutea	Wild Mignonette, June 9.
Viola canina	Dog Violet, white and purple varieties on Ramsbury Common, June 4, *J. W. P.*
• Dianthus cæsius ...	Cheddar Pink, June 9.
Silene inflata	Bladder Campion, June 4, *R. R. P. H.*
Lychnis flos-cuculi ...	Ragged Robin, full flower June 7, *A. M.*, in the osier bed near the College; found also at Brimslade and Bedwin.
Stellaria graminea ...	Lesser Stitchwort, full flower, June 23, *W. G. N.*
Malva sylvestris ...	Common Mallow, June 19, *A. P. H.*
• Hypericum Androsæmum	Tutsan, by June 25.
H. pulchrum	Upright St. John's-wort, June 21, *R. R. P. H.*
Acer Pseudo-platanus ...	Sycamore, one tree in full flower June 13.
Geranium pratense ...	Crowfoot Crane's-bill, June 13, *H. W. H.* and *R. R. P. H.*
• G. sanguineum	Bloody Crane's-bill, June 9.
Linum catharticum ...	Mil-mountain, full flower June 13, *R. R. P. H.*
Rhamnus Catharticus ...	Buckthorn, June 6.
• Cytisus Laburnum ...	Laburnum, some trees finished flowering, others only just coming into flower, June 9.
GENISTA TINCTORIA ...	Dyer's Green-weed, Clatford Vale, in bud June June 13, *H. T. S.*
Ononis arvensis	Rest-harrow, Clench, in flower June 13.
Vicia Sylvatica	Wood Vetch, by June 23.
V. Cracca	Tufted Vetch, June 19, *R. R. P. H.*
Lathyrus pratensis ...	Everlasting Tare, June 8, *R. R. P. H.*
Spiræa Ulmaria	Meadow-sweet, in bud June 6, *R. R. P. H.*, not in flower by June 30.
Fragaria vesca	Strawberry, ripe fruit (wild) June 23, *W. G. N.*
Rubus Idæus	Raspberry, June 4, *R. R. P. H.*
Rubus	Blackberry, a very few flowers out as early as June 6, *R. R. P. H.*, not generally in flower by June 30.

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R. Cæsius	Dewberry, June 1, *E. A. K.*
Rosa canina	Dog Rose, June 9, *R. R. P. H.*
R. arvensis	Trailing Dog Rose, bud June 11, *T. E. M.*, in flower shortly afterwards.
R. micrantha	by June 23.
Crataegus oxyacantha ...	Hawthorn, in full perfection June 13.
Epilobium montanum ...	Broad-leaved Willow Herb, June 13, *R. R. P. H.*
Sedum acre	Biting Stonecrop, full flower by June 20.
* Philadelphus coronarius...	Syringa, June 8, *C. E. G., A. M.*, &c.
Ægopodium podagraria...	Goutweed, by June 1.
Œnanthe crocata ...	Water Dropwort, June 6.
Heracleum Sphondylium	Hogweed, June 4.
Torilis anthriscus ...	Hedge Parsley, June 4.
Chærophyllum Temulum	Rough Chervil, bud June 11, *T. E. M.*, in flower very shortly afterwards.
Cornus sanguinea ...	Dogwood, June 19, *R. R. P. H.*
Sambucus nigra... ...	Elder, just in flower June 2, *A. H. B. R.*; June 3, *W. G. N.*
Viburnum opulus ...	Guelder Rose, barren flower June 3, *T. E. M.*
Lonicera periclymenum...	Honeysuckle, June 6, *R. R. P. H.*
* Symphoricarpos racemosa	Snowberry, by June 28.
Asperula Cynanchica ...	Quinancy-wort, full bud June 13, *R. R. P. H.*, flower June 28, *W. G. N.*
Gallium Mollugo ...	Great Bastard Madder, June 15, *R. R. P. H.*
G. verum...	Lady's Bedstraw, bud June 11, *T. E. M.*, nearly out June 29.
G. saxatile	Smooth Heath Bedstraw, June 7, *A. P. H.*
Valeriana officinalis ...	Valerian, June 21, *F. J. H. J.*
Valerianella dentata ...	Narrow-fruited Corn Salad, June 21, *R. R. P. H.*
Knautia arvensis ...	Field Scabious, June 8, *R. R. P. H.*
Anthemis arvensis ...	Corn Chamomile, June 8 (near Martinsell), *R. R. P. H.*
A. cotula...	Mayweed, June 19, *R. R. P. H.*
Achillea millefolium ...	Yarrow, June 21, *R. R. P. H.*
* A. tomentosa	by June 9.
Filago Germanica ...	Cudweed, June 14, *G. F. R.*
Senecio Jacobæa... ...	Ragwort, in bud June 11, *T. E. M.*, not out June 29.
Centaurea nigra... ...	Black Knapweed, June 11, *T. E. M.*
C. Scabiosa	Great Knapweed, June 8, *R. R. P. H.*

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Carduus lanceolatus ...	Spear Thistle, bud June 4, *T. E. M.*; not out June 29.
C. palustris	Marsh Thistle, June 13, *T. E. M.*
• Silybum marianum ...	Milk Thistle, June 9.
Lapsana communis ...	Nipplewort, by June 28.
Hypochœris radicata ...	Cat's-ear, June 3, *R. R. P. H.*
Tragopogon minor ...	Goat's-beard, June 7, *J. C. P.*
Crepis virens	Smooth Hawk's-beard, June 8, *R. R. P. H.*
Hieracium boreale ...	Shrubby Hawk-weed, in bud June 8, Martinsell, *R. R. P. H.*; in flower, Martinsell, June 14, *T. E. M.*
Campanula glomerata ...	Clustered Bell-flower, June 21, *Atthill.*
Menyanthes Trifoliata ...	Bog-bean, by June 6, *H. R. P.*
Convolvulus arvensis ...	Field Bindweed, June 14, *W. W. D.*
Cynoglossum officinale ...	Hound's-tongue, June 6, *G. F. R.*
Solanum Dulcamara ...	Bitter-sweet, June 11, *T. E. M.*
• Atropa Belladonna ...	Deadly Nightshade, June 9.
Hyoscyamus niger ...	Henbane, June 6, Forest Hill, *H. M. H.*; found also in the Forest, near Iveson's Farm, by *W. W. D.*
Orobanche minor ...	Lesser Broom-rape, June 15, *J. J. P.*, in the Marlborough Water Meadows.
O. elatior	Tall Broom-rape. A specimen, probably of this species, found in a very young state, near the Butts, by *A'Court.*
Verbascum Thapsus ...	Great Mullein, June 25, *F. J. H. J.*
Linaria vulgaris ...	Yellow Toad-flax, June 11, *S. A. R.*
• Digitalis purpurea ...	Foxglove, June 9.
Eupharsia odontites ...	Red Bartsia, June 25, *R. R. P. H.*
Veronica Beccabunga ...	Brooklime, June 6, *H. A. M.*
V. officinalis	Common Speedwell, June 19, *J. W. P.*
Thymus serpyllum ...	Wild Thyme, June 4, *E. L.*
Prunella vulgaris ...	Self-heal (white variety), June 25, *R. R. P. H.*
Stachys sylvatica ...	Hedge Woundwort, June 11, *T. E. M.*
Plantago media ...	Lamb's Tongue, June 4, *H. R. A.*
Rumex conglomeratus ...	Sharp Dock, June 28.
R. obtusifolius	Broad-leaved Dock, by June 28.
R. crispus	Curled Dock, in flower June 28.
Populus nigra	Black poplar, in leaf about June 10.
Corylus Avellana ...	Hazel; fully-formed fruit, June 13, *T. E. M.*

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* Castanea vulgaris	...	Sweet Chestnut, unopened catkins June 11, *T. E. M.*
Tamus communis	...	Black Bryony, June 10, *A H. B. R.*
Orchis maculata	...	Spotted Hand Orchis, June 6, *G. F. R.*
O. pyramidalis	...	Pyramidal Orchis, June 21, Martinsell, *R. R. P. H.* Found also on White Horse Down by *S. A. R.*, and on Pewsey Hill by *R. R. P. H.*
Gymnadenia Conopsea	...	Red-handed Orchis, June 21, *R. R. P. H.*
Habenaria viridis	...	Frog Orchis, near Rabley Copse, June 19, *R. R. P. H.*
H. chlorantha	...	Butterfly Orchis, June 11, *S. A. R.*
Ophrys Apifera...	...	Bee Orchis, Martinsell, June 17, *A.A.*
Iris Pseud-acorus	...	Yellow Flag, by June 6, *H. R. P.*
* Allium schœnoprasum	...	Chives, June 9.
Juncus effusus ...	...	Common Soft Rush, in bud June 13, *R.R.P.H.*
Carex Hirta ...	...	Hairy Sedge, College bathing place, in seed June 15, *G. F. R.*, probably this species.
Phalaris arundinacea	...	Reed-grass, panicles appearing June 28.
Phleum pratense	...	Timothy-grass, June 14, *J. W. P.*
Alopecurus agrestis	...	Black-grass, June 6, *G. F. R.*
Holcus lanatus	...	Soft-Grass, June 13, *R. R. P. H.*
Aira cæspitosa ...	...	Hair Grass, panicles appearing June 28.
Trisetum flavescens	...	Yellow Oat-grass, June 14, *J. W. P.*
Arrhenatherum avenaceum		Oat-grass, by June 13.
Kœleria cristata	...	Crested Hair-grass, about June 6.
Briza media ...	...	Quaking Grass, June 2, *J. W. P.*
Cynosurus Cristatus	...	Dog's-tail Grass, about June 6.
Bromus sterilis ...	...	Barren Brome-grass, full flower June 28.
Triticum repens ...	...	Couch Grass, June 28.
		Wheat, flower June 13, *R. R. P. H.*
		Oats, panicles June 13, *R. R. P. H.*
Lastrea filix-mas...	...	Male Fern, fructification June 4, *T. E. M.*
L. Oreopteris ...	...	Sweet Mountain Fern, full-sized fronds June 13, *G. A. H.*

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ENTOMOLOGY.

In Entomology a very fair amount of work has been done, especially when the very unfavourable state of the weather is taken into account. By members of the School fifteen new species have been added to our List, and some progress has been made towards obtaining a proper List of the small Moths, though the intervention of the holidays presents an almost insuperable barrier to any fair degree of success in that line. As in Botany, great want is felt for the co-operation of residents in the neighbourhood, and therefore we are very glad to secure one, Mr. Henry Selfe, of Marten, near Burbage; yet even he is out of our range, and we can only secure his assistance in a very limited degree.

We are anxious to do more in the way of rearing of insects, and of thereby obtaining their life histories. Some progress has been made in this, especially by Dayman, which we hope will be carried on successfully by other members of the section next half-year. We cannot close these remarks without expressing our regret at losing our "Captain" next Michaelmas, and our earnest hope that some member of the Society, of a sufficiently high standing in the school, will come forward to fill his place.

Names of those whose initials are given in the following List:—

M. O. A.	M. O. Alison
A. C. A.	A. C. Almack
H. G. B.	H. G. Bailey.
A. B.	A. Bell.
H. B.	Rev. H. Bell.
R. H. B.	R. H. Brown.
L. C. C.	L. C. Calley.
C. H. C.	C. H. Chadwick.
J. G. C.	J. G. Crosse.
E. H. D.	E. H. Davis.
R. C. D.	R. C. Davis.
W. W. D.	W. W. Dayman.
R. H. D.	R. H. Duthie.
W. D. F.	W. D. Fenning.
J. E. H.	J. E. Hilliard.
A. C. H.	A. C. Hilton.
H. M. H.	A. M. Hilton.
H. W. H.	H. W. Hockin.
G. H.	G. Holden.
F. J. H. J	F. J. H. Jenkinson.
J. H. J.	J. H. Johnson.

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E. A. K.	E. A. King.
G. A. L.	G. A. Lefroy.
R. B. M.	R. B. Mainwaring.
E. B. M.	E. B. Maitland.
W. M.	W. Mansell, Esq.
A. M.	A. Marshall.
H. C. O.	H. C. Oakley.
J. C. P.	J. C. Palmer.
D. D. P.	D. D. Passy.
C. E. P.	C. E. Powell.
W. J. P.	W. J. Pratt.
T. A. P.	Rev. T. A. Preston.
J. C. R.	J. C. Rogers.
G. F. R.	G. F. Ruck.
H. S.	Mr. Henry Selfe, Burbage.
J. S.	Rev. J. Sowerby.
H. T. S.	H. T. Stainton, Esq., Lewisham.
R. P. V.	R. P. Van Heythuysen.
R. W. W.	R. W. Wickham.

LEPIDOPTERA.

Gonepteryx Rhamni ...	Brimstone, seen March 6, *E. A. K.*
Pieris Brassicæ ...	Large White, April 30, *A. M.*
P. Rapæ	Small White, April 20 to 22.
P. Napi	Green veined White, seen April 22, *L. C. C.*
Anthocharis Cardamines	Orange Tip, April 22, *A. C. A.*
Leucophasia Sinapis ...	Wood White, June 21, *J. H. J.*
Lasiommata Ægeria ...	Speckled Wood, June 8, *J. H. J.*
L. Megæra	Wall, May 19, *H. W. H.*
Hipparchia Janira ...	Meadow Brown, seen May 23, *H. W. H.*; caught June 15, *J. E. H.*
Cœnonympha Pamphilus	Small Heath, May 19, *J. H. J.*
Cynthia Cardui	Painted Lady, seen May 15, *J.S.*; caught May 18, *J. E. H.*
Vanessa Atalanta ...	Red Admiral, seen June 22, *A. C. H.*
V. Io	Peacock, seen March 18, *E. H. D.*
V. Polychloros	Large Tortoise-shell, seen April 29, *H. W. H.*
V. Urticæ	Small Tortoise-shell, seen during the first week in March.

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Grapta C-album ...	Comma, April 18, at Marten, *H. S.*
Argynnis Selene ...	Small Pearl-bordered Fritillary, June 1, *A.C.H.*
A. Euphrosyne	Pearl-bordered Fritillary, May 16, *C. E. P.*
Melitæa Artemis ...	Greasy Fritillary, Larvæ, April 22, *H. W. H.* and *J. H. J.*; Imago taken May 22; taken also on Forest Hill, by *J. H. J.*
Nemeobius Lucina ...	Duke of Burgundy F., worn specimens taken Rabley Copse, June 8, *J. H. J.*
Thecla Rubi	Green Hair-streak, seen in Manton Copse June 13, *H. T. S.*
Chrysophanus Phlæas ...	Small Copper, May 15, *J. H. J.*
Polyommatus Alsus ...	Bedford Blue, May 28, *J. H. J.*
P. Alexis	Common Blue, May 23, *R. C. D.*
	A "blue butterfly" was seen May 14, by *H.B.*
P. Agestis	Brown Argus, May 28, *W. J. P.*
Thymele Alveolus ...	Grizzled Skipper, May 14, *J. E. H.*
Thanaos Tages	Dingy Skipper, May 16, *J. E. H.* and *J. H. J.*; taken at Rabley by *T. A. P.*
Pamphila Sylvanus ...	Large Skipper, seen June 3, *H. W. H.*
Procris Statices	Green Forrester, June 2, *F. J. H. J.*
Anthrocera Filipendulæ	Six-spotted Burnet, Larva, May 22, *A. M.*; Pupa, May 23, *H. M. H.*; Imago, June 13, *H. M. H.*
Smerinthus Ocellatus ...	Eyed Hawk, taken at Light June 10, *A. C. A.*
S Populi...	Poplar Hawk, ditto June 8, *R. P. V.*
Chærocampa Porcellus ...	Small Elephant, Savernake Forest, June 6, *G. H.*
Macroglossa Stellatarum	Humming-Bird, seen April 22 by *Mr. Featherstone*; taken April 25, *R. W. W.*
Hepialus lupulinus ...	Common Swift, May 25, *E. B. M.*
H. Humuli	Ghost, June 12, *W. M.*
H. Velleda	Beautiful Swift, Rabley Copse, June 9, *H.M.H.*
Cerura Vinula	Puss Moth, Pupæ taken at Mildenhall by *E. H. D.*, and in the Forest by *W. W. D.*
Pterostoma Palpina ...	Taken at light June 17, *W. W. D.*
Lophopteryx Camelina ...	Coxcomb Prominent, May 15, *G. F. R.*
Pygæra Bucephala ...	Buff Tip, May 27, *G. F. R.*
Gnophria rubricollis ...	Taken in West Woods June 21, *C. E. P.* and *F. J. H. J.*
Nemeophila Plantaginis...	Wood Tiger, May 28, *W. J. P.*

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Phragmatobia fuliginosa	Ruby Tiger, on Railway Bank May 16, *G A.L.*
Spilosoma menthrasti ...	Large Ermine, May 22, *H. W. H.*
S. lubricepeda	Spotted Buff, June 5, *D. D. P.*
Diaphora mendica ...	Muslin, May 18, *J. H. J.*
Lasiocampa Quercus ...	Oak-Eggar, larva taken May 5, *J. H. J.*
Cilix Spinula	Chinese Character, May 19, *E. H. D.*
Drepana Falcataria ...	Pebble Hooktip, May 21, *R. C. D.*
D. Unguicula	Barred Hooktip, May 24, *W. D. F.*
Acronycta Psi	Dagger, June 18, *J. H. J.*
Xylophasia Polyodon ...	Dark Arches, June 25, *H.C.O.*
Malmestra Brassicæ ...	May 30, *E. H. D.*
Apamea Basilinea ...	June 14, *C. E. P.*
Grammesia Trilinea ...	Treble-lines, June 3, *W. W. D.*
Caradrina Cubicularis	At Preshute, June 15, *A.M.*
Agrotis Exclamationis ...	May 26, *J. H. J.*
Triphæna Pronuba ...	Yellow Underwing, April 20, *M. O. A.*
Taeniocampa Rubricosa...	Marlborough Common, March —, *E.H. B.*
T. Munda...	Bred from pupa taken near Marlborough, *E. H. D.*
Phlogophora meticulosa...	Angle-shades, June 17, *Churchill.*
Calocampa Exoleta ...	Taken at Preshute, November, 1865, *W. W.D.*
Cucullia Umbratica ...	The Shark, June 25, *H. G. B.*
Plusia gamma	Silver Y., June 7.
Gonoptera Libatrix ...	Herald, April 18, *G. F. E.*
Mania typica	June 29, *T. A. P.*
Euclidia Mi	May 19, *J. H. J.*
Phytometra Ænea ...	May 23, *C. E. P.*
Rumia Cratægata ...	Brimstone, May 26, *J. E. H.*
Selenia Illunaria ...	Early Thorn, June 10, *F. J. H. J.*
Odontopera Bidentata ...	Scolloped Oak, June 5, *R. B. M.*
Amphidasis Prodromaria	Oak Beauty, *A B.*
Hemerophila Abruptaria	Waved Umbre, May 15, *E. H. D.*
Iodis lactearia	May 25, *J. E. H.*
Ephyra punctaria ...	At Manton Copse, June 6, *J. H. J.*
Asthena Candidata ...	Small White Wave, May 23, *J. H. J.*
Lozogramma Petraria ...	Brown Silver-line, May 19, *E. H. D.*
Fidonia Atomaria ...	Heath, May 29, *J. C. E.*
Minoa Euphorbiata ...	June 4, *J. E. H.*
Ligdia Adustata	Scorched Carpet, June 2, *A. C. H.*
Lomaspilis marginata ...	Clouded Border, May 23, *J. H. J.*

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HIBERNIA RUPICAPRARIA	Manton, March 4, *A. M.*
H. Progemmaria ...	Dotted Border, first week in March, *J. S*;
Anisopteryx Æscularia ...	March 18, *A. M.*
Larentia miaria	Green Carpet, May 28, *F. J. H. J.*
Emmelesia alchemillata	Small Rivulet, June 21, *H. M. H.*
E. BLANDIATA	May 29, *J. E. H.*
Eupithecia centaureata	May 19, *J. H. J.*
E. vulgata	Common Pug, May 26, *J. E. H.*
Melanippe Ocellata ...	Purple-bar Carpet, June 2, *H. M. H.*
M. Hastata	Argent and Sable, June 8, *A. C. H.*
M. UNANGULATA... ...	Savernake Forest, May 27, *J. C. P.*
M. Biriviata	April 26, *E. C. D.*
M. Montanata	Silver Ground Carpet, May 28, *A. C. H.*
M. Fluctuata	Garden Carpet, April 26, *A. M.*
Anticlea Derivata ...	At Ramsbury, April 27, *J. G. C.*
Coremia Propugnata ...	May 22, *F. J. H. J.*
C. Ferrugaria	May 2, *J. H. J.*
Camptogramma Bilineata	Yellow Shell, June 6, *H. M. H.*
Cidaria Russata	Marbled Carpet, June 7, *F. J. H. J.*
C. CORYLATA	Broken-barred Carpet, June 2, *J. H. J.*
Eubolia Plumbaria ...	Belle, June 21, *C. H. C.*
Odezia Chærophyllata ...	Chimney-sweep, June 7, *A. C. A.*
Pyrausta Purpuralis ...	Crimson and Gold, May 22, *H. M. H.*
P. Ostrinalis	May 22, *J. H. J.*
Herbula cespitalis ...	May 8, *J. H. J.* (common).
ENNYCHIA ANGUINALIS ...	At Clatford, *H. W. H.*, &c.
BOTYS FUSCALIS	Rabley Copse, June 8, *H. M. H.*
B. urticata	Small Magpie, May 31, *H. W. H.*
Pionea forficalis	Garden Pebble, June 2, *J. H. J.*
Scopula Olivalis ...	White Brindled, June 10, *F. J. H. J.*
Simaethis Fabriciana ...	Nettle Tap, May 22, *A. E. H.*
Crambus pratellus ...	May 28, *J. H. J.*

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ORNITHOLOGICAL SECTION.

SINCE the formation of this section, at the beginning of the past egging season, the study of ornithology has been carried on much more systematically than last year. Eggs have been collected with great energy and success, and several very curious varieties have been found, among which we may mention a spotless thrush's and jackdaw's. Separate meetings of this section have been frequently held, at which many of our Marlborough birds were discussed, and also any notices of them or of their eggs that had been lately recorded. Our thanks are due to several members of this section for their perseverance in collecting and regularity in the record of notices, among whom we may mention the names of E. H. Carr, J. W. Parrington, A. Herklots, and J. F. Blackburn, which will be seen to occur frequently in the following list. But, while thanking these members, we also feel it our duty to say that we should be glad to see the study of ornithology pursued rather more scientifically, while with its practical pursuit we can find no fault. We should be also glad to see more use made of the recorded notices, which will be always open to any one on application to the Head of the Section, and a more earnest attempt to become intimately acquainted with the habits and history of each of our Marlborough birds.

Unless stated to the contrary, the dates given are those on which the first eggs were taken, which in most cases are probably the first eggs laid this year.

Falco tinnunculus	...	Kestrel, April 16, *E. H. Carr*; *J. W. Parrington.*
Falco nisus ...	...	Sparrow Hawk, April 12, *E. H. Carr*; *A. Herklots.*
Otus vulgaris ...	...	Long-eared Owl, young bird April 18, *F. N. Roger.*
Strix flammea ...	...	White Owl, April 26, *E. H. Carr*; *E. A. King.*
Lanius collurio ...	...	Red-backed Shrike, May 6, *A. B. H. Harenc.*
Turdus viscivorus	...	Missel Thrush, egg March 28; hard set April 4, *E. W. Rooke*; young bird April 10, *L. C. Calley, P. Thursby.*
Turdus pilaris ...	...	Fieldfare, flock seen March 27, *A. Herklots.*
Turdus musicus ...	...	Song Thrush, March 25, *R. F. Isaacson.*
Turdus merula ...	...	Blackbird, March 28, *S. A. Rogers.*
Turdus torquatus	...	Ring Ouzel, April 30, *E. H. Carr, J. W. Parrington.* The bird was seen to fly off the nest.
Accentor modularis	...	Hedge Sparrow, April 4, *A. Herklots.*

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Erythaca rubecula	...	Redbreast, April 2, *J. E. Fenwick.*
Phœnicura ruticilla	...	Redstart, May 3, *G. R. Green.*
Saxicola rubicolia	...	Stonechat, April 28, *P. Thursby, F. B. Jarvis.*
Saxibola rubetra	...	Whinchat, young birds, May 16, *A. Herklots, F. N. Roger.*
Saxicola œnanthe	...	Wheatear, May 14, *H. W. Unwin, W. F. J. Farquharson.*
Saxicola locustella	...	Grasshopper Warbler, May 30 (hard set), *E. H. Carr, R. B. Hamilton.* Several other nests were taken after this.
Salicaria phragmitis	...	Sedge Warbler, April 30, *H. W. Hockin.*
Philomela luscinia	...	Nightingale, heard May 8, *J. W. Parrington;* May 15, *Rev. H. E. Booth.*
Curruca atricapilla	...	Blackcap, May 5, *J. H. Johnson.*
Curruca hortensis	...	Garden Warbler, May 26, *E. H. Carr, R B. Hamilton.*
Curruca cinerea	...	Common Whitethroat, May 11, *E. Freeman.*
Curruca sylviella	...	Lesser Whitethroat, May 15, *J. F. Blackburn, A. Herklots.*
Sylvia sylvicola ...	...	Wood Warbler, May 14, *E. H. Carr, E. L. King.*
Sylvia trochilus ...	...	Willow Warbler, May 15, *A. T. Richards.*
Sylvia hippolais...	...	Chiff-Chaff, heard April 20, *J. W. Parrington.*
Regulus cristatus	...	Golden-crested Wren, Ap. 30, *J. E. Fenwick.*
Parus major ...	...	Great Tit, April 26, *L. C. Calley, P. Thursby.*
Parus cœruleus ...	...	Blue Tit, April 22, *J. E. Fenwick.*
Parus ater ...	...	Cole Tit, May 13, *J. E. Fenwick*
Parus candatus ...	...	Long-tailed Tit, April 22, *A. Herklots.*
Motacilla Yarrellii	...	Pied Wagtail, April 24 (hard set), *A. C. Master, F. Blackburn.*
Anthus arboreus	...	Tree Pipit, May 16, *A. C. Hilton, H. M. Hilton.*
Anthus pratensis	...	Meadow Pipit, April 29, *E. H. Carr.*
Alauda arvensis	...	Sky Lark, April 20, *E. A. King, E. L. King.*
Alauda arborea ...	...	Wood Lark, heard March 11, *H. W. Hockin.*
Emberiza miliaria	...	Common Bunting, May 12, *W. Dowding.*
Emberiza Schœniclus	...	Black-headed Bunting, April 30, *E. H. Carr, E. A. King.*
Emberiza citrinella	...	Yellow-hammer, April 31, *L. Williams, S. Smallpiece.*
Fringilla cœlebs ...	...	Chaffinch, April 20, *P. Thursby, L. C. Calley.*

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Passer domesticus ...	House-sparrow, young birds April 19, *E H. Carr, J. G. Crosse.*
Coccothraustes chloris ...	Greenfinch, April 26, *L. Williams.*
Carduelis elegans ...	Goldfinch, May 29, *E. H. Carr, J. F. Blackburn.*
Linota cannabina ...	Linnet, April 14, *E. H. Corr, J. W. Parrington.*
Pyrrhula vulgaris ...	Bullfinch, April 28, *E. H. Carr, E. L. King.*
Sturnus vulgaris ...	Starling, April 17, *E. H. Carr, J. G. Crosse.*
Corvus corax	Carrion Crow, May 12, *A. C. Master.*
Corvus frugilegus ...	Rook, March 19, *R Hawkins.*
Corvus monedula ...	Jackdaw, by April 15, *A. Herklots, J. F. Blackburn.*
Picus caudata	Magpie, April 2, *E. A. King, E. W. Rooke.*
Garrulus glandarius ...	Jay, April 18, *L. C. Calley, P. Thursby.*
Picus viridis	Green Woodpecker, May 27, *E. Lloyd, H. C. Tisdall.*
Certhia familiaris ...	Common Creeper, April 26, *T. F. Back.*
Troglodytes vulgaris ...	Common Wren, April 28, *J. W. Parrington, A. Dolben.*
Sitta Europæa	Nuthatch, May 14, *E. H. Carr, J. F. Blackburn.*
Cuculus canorus... ...	Cuckoo, heard April 11, *E. L. Bernays*; egg, May 15, *E. H. Carr, K. F. Boyd.*
Hirundo rustica	Swallow, seen April 1, *G. K. Mills*, eggs, June 10, *E. H. Carr.*
Hirundo urbica	Martin, seen May 5, *A. C. Almack*; eggs, June 11, *Rooke.*
Hirundo riparia	Sand Martin, seen April 30, *A. C. Almack*; eggs, May 15, *Maitland.*
Cypselus apus.	Swift, seen April 25, *E. Tilleard*; eggs, May 9, *E. H. Carr, J. F. Blackburn.*
Columba palumbus ...	Ring Dove, eggs set, April 18, *J. C. Palmer.*
Columba œnas	Stock Dove, April 10, *E. H. Carr, E. A. King.*
Columba turtur	Turtle Dove, May 9, *R. Kingsford.*
Phasianus colchicus ...	Pheasant, April 29, *E. H. Carr, R. B. Hamilton.*
Perdix cinerea	Partridge, April 2, *E. Field.*
Œdicnemus crepitans ...	Stone Curlew, May 26, *H. Soames.*
Vanellus cristatus ...	Peewit, seen in flocks up to March 21; eggs hard set April 27, *A. H. B. Harenc*; young birds, April 27, *H. R. Parrington, C. E. Powell.*
Ardea cinerea	Heron, seen on the canal, March 27, *A. Herklots*

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Scolopax gallinago	...	Common Snipe, seen March 28, *G. H. Dawson.* March 29, *A. C. Almack*; April 17, *J. W. Parrington.*
Crex pratensis ..	...	Land Rail, heard April 26, *H. W. Hockin*; eggs hard set June 13, *E. H. Carr, E. L. King.*
Rallus aquaticus...	...	Water Rail; one shot on the river in January; one seen April 8, *J. W. Parrington.*
Gallinula chloropus	...	Moorhen, April 11, *A. Herklots, J. F. Blackburn.*
Fulica atra ...	...	Coot, May 4, *F. C. Lightfoot,*
Anas boschas ...	...	Wild Duck, March 21, *E. L. King, H. M. Spencer.*
Anas crecca ...	...	Teal, seen May 3, *J. W. Parrington.*
Podiceps minor ...	...	Dabchick, April 26 (hard set) *E. W. Rooke.*

A. C. ALMACK, *Head of the Section.*

OBSERVATIONS ON THE WEATHER.

N.B.—The passages quoted are from Mr. Glaisher's Report of the Weather, published by the Registrar General.

"THE weather at the beginning of the year was stormy, with gales of wind. The temperature was high for the season. On the 11th day there fell an unusual amount of sticking snow, of great specific gravity. The snow was of that unusual dense character that six inches in depth produced water to the depth of 1½ inches nearly. A very rapid thaw set in, and within two or three days all the snow disappeared, followed, however, by rivers overflowing their banks. All the low-lying lands along the valley of the Thames were under water. The weather continued changeable throughout January, with heavy rain and gales of wind."

Such was the weather generally over England. At Marlborough there were not very strong winds till about the 7th, when they lasted for about five days. On the 21st and 22nd the wind was also high, but at other times it

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seems to have been very moderate, hence though the humidity was very great, it cannot be called a stormy month. On the 11th about 5¼ inches of snow fell. This I have considered equivalent to ·630 inches of rain, though, according to Mr. Glaisher, it ought be more than double that amount. The mean temperature was remarkably high, being 41·5°; for England generally it was 42·6°, and was higher than in any January since that of 1851. The mean temperature of the preceding month, December, was 42.0°, the average for England being 42·4°. "Usually January is 2·8° colder than the preceding month," yet on this occasion it was only 0.5° of lower temperature at Marlborough. "It was 4¼° above the average of the previous 25 Januaries," for England generally; and at Marlborough 7·0° above the temperature of January, 1865.

"The extremely mild weather in January and the first part of February stimulated vegetation to a very unusual activity at this season. Hedges and early fruit trees were budding, and some were ready to burst into blossom. This unusual temperature continued till the 12th February, and the average excess up to this time was 6° daily. From the 13th of February till the 15th of March the weather was cold, and nearly constantly below the average of the season of the year. The average daily defect of temperature for this period was 2·9°; four days of warm weather followed, each day being about 2·0° in excess of its average temperature. This was succeeded by four days of very cold weather, the defect averaging 4¼° daily, and the quarter closed with eight days whose temperature exceeded their average by 6·0°."

"The mean temperature of February was 40·5°, being 1·9° above the average of the preceding 25 Februaries, and 3·9° above that of last year. Every month, from September to this month inclusive, has been of higher temperature than their averages to the mean amount of 3·9° nearly."

"The mean temperature of March was 40·5°, the same as in February, being 1·2° below the average of the preceding 25 years, and 3·9° above that of last year."

Upon comparing these results with those given in the table, it will be seen that the weather at Marlborough has been very similar to what it was over England generally. February and March were a little colder; but the general variations of temperature were similar. The weather in those months was remarkably changeable, and very damp, accompanied with strong winds and hurricanes, producing a very large amount of sickness. Snow fell frequently, though not to any great amount.

During April the temperature continued to increase steadily, though not rapidly (with but slight intermissions, from the 8th to the 13th), till the 24th, when it rose rapidly. The 26th and 27th were very hot, but on the 28th the temperature fell, and by the 29th the maximum temperature was no less than 28° lower than it was on the 27th, and a very cold period set in. The mean

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temperature of the month was below that of 1864, and far below that of last year. The month, as a whole, was not a healthy one; the weather was very changeable, there being no less than 14 ground frosts, and the wind very high at times, accompanied with much rain. "The sudden drying weather (on the 26th and 27th) caused large tracts of land at all parts of the country to be in such a heavy state that Spring operations, particularly sowing, were much impeded, and, in fact, agricultural purposes generally were in a backward state. The budding of trees was in general late, but at places where they had not already shot out their leaves the effect of this weather was extraordinary, the leaves appearing, and fruit trees blossoming so suddenly, that the whole aspect was changed in a few hours."

The cold weather on the 29th seriously affected all the crops, and cut off much of the blossom from fruit trees. The growth of wheat, barley, and oats was much retarded, although in some very rich lands the cereal crops had in a measure recovered by the end of May. Pasture land made little or no progress, and rain was much required."

The weather during May was very unsettled. The cold period which began on the 29th of April continued during the early part of May, so that snow fell on the 4th. The temperature reached its maximum on the 19th, but has been very variable throughout the month. At night it has been exceedingly cold, the thermometer on the ground being above freezing on eleven nights only during the whole month.

"On June 2nd the weather again changed, and became much warmer, and a mean daily excess over the average temperature occurred to the amount of 4·2° till the 11th day. A similar cold period followed, but on the 21st day the temperature again increased considerably, and fine weather followed till the end of the quarter, the mean daily excess of temperature amounting to nearly 5°. By this time the crops were generally in a pretty favourable condition—haymaking had progressed well, though somewhat below the average in quantity. There were some fears that the wheat crop would be light. Potatoes were promising, and free from disease. To the end of the quarter there were no choleraic meteorological symptoms."

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	Mean height of Barometer.		Monthly range.		Mean temperature of air.		Mean daily range.		Maximum in shade.		Minimum in shade.		Maximum in sun.		Minimum on Grass.		Mean degree of Humidity		Mean amount of Cloud.		Amount of Rain.		No. of days on which it fell.	
	1866	1865	1866	1865	1866	1865	1866	1865	1866	1865	1866	1865	1866	1865	1866	1865	1866	1865	1866	1865	1866	1865	1866	1865
	in	in	in	in	°	°	°	°	°	°	°	°	°	°	°	°					in	in		
JANUARY ...	29·375	29·109	1·778	1·764	41·5	34·4	12·7	11·8	58.8	50·1	16.1	5·8	85·1	74·7	13·8	3·2	89.2	92·0	7·8	6·8	4·400	3·858	23	18
FEBRUARY	29·227	29·411	1·770	1·716	39·7	35.2	13·2	11·2	58.6	49·8	37·2	17·4	88·9	104·9	15·5	9·7	90.4	93·5	7·2	8.4	3·857	2·344	22	19
MARCH.....	29·221	29·431	1·340	1·110	39·5	35·6	14·9	13·9	61·6	51·7	15·3	21·8	115·9	110·8	12·6	11·8	86.4	81·9	7·9	8·0	2·327	1·206	20	15
APRIL.....	29·430	29·649	0·986	0·524	46.3	52·0	15·8	24·3	72·8	77.6	30·0	29·4	122·0	129·9	20·5	16.0	83.7	73·5	7·0	4·7	2·393	0·988	21	8
MAY	29·512	29·457	0·872	0·854	48·8	53·8	21·0	21·7	70·9	78·0	25·7	33·2	122·5	135.7	18·3	24.4	67.4	80·0	5·8	7·3	1·919	2·622	10	22
JUNE	29·469	29·740	0·814	1·280	58·8	59·8	19·4	25·1	81·0	88.7	39·7	37·5	121·0	149·0	42·2	29·0	78.0	69·5	6·6	5·4	3·238	2·827	18	6
MEAN.....	29·372	29·466	1·260	1.208	45·8	45·1	16·2	18·0	...	...	...	...	...	...	...	...	82·5	81·7	7.0	6·3	...	...	...	...

Total amount of rain during the six months in 1866, 18·134 inches; in 1865, 13·845 inches.

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REPORT

OF THE

MARLBOROUGH COLLEGE

Natural History Society,

FOR THE

HALF-YEAR,

ENDING CHRISTMAS, 1866.

"Tum mihi Naturæ libeat perdiscere mores,
Quis Deus hanc mundi temperet arte domum."

MARLBOROUGH:

Printed and Published by C. Perkins, Times Office.

1867.

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PREFACE.

To be restlessly desirous of rapid and striking progress, is not a wise or favourable attitude for either the Committee or the Members of a Scientific Society.

"Science moves but slowly, slowly,"

is no more or less than the fact. And the students of Science should be content to move slowly too, provided that their operations are not stagnating, and that their advance, if slow, is nevertheless sure. In making another half-yearly record of the life of our Society, we may congratulate the Members on this kind of steady progress. We have nothing startling to announce, but we can speak of a good many points made in the right direction.

For example, we have had an excellent paper on the geology of the drift-beds in the neighbourhood, by S. B. Dixon, Esq., of Pewsey. This is the kind of co-operation we want—the aid of scientific observers who are, so to speak, within our own circle of observation, but a little beyond those points which we are able to reach by our ordinary means of locomotion. Another token of neighbourly interest may be mentioned. Mr. J. Coleman, of East Kennett, has presented the Society with a Phalarope (*Phalaropus Lobatus*), shot by himself. Our President had noticed in the *Marlborough Times* the announcement of such a bird having been shot, the paragraph stating that the bird was a Stormy Petrel. It was through his vigilance and active inquiry that the bird was properly classified, and eventually presented by the owner to the Museum. We earnestly hope that persons living in and near Marlborough will kindly come forward more and more actively in aid of our observations and collections.

Until the unfavourable weather set in, all the Society's Sections were in active and more systematic progress. We must not omit to mention that the Geological Section (led and stimulated by Mr. Mullins), made two excursions, to Bicknell, and to Swindon.

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The Library is moving forward. Professor Newton, of Cambridge, has presented a copy of his valuable *Ootheca Wolleiana*, an account of the splendid egg collections left by the late Mr. Wolley. The Rev. J. M. Fuller continues to supply the *Intellectual Observer* and *Popular Science Review*. The President has contributed complete sets of the *Entomologist* and the *Entomologist's Monthly Magazine*, besides the *Ornithological Dictionary*, and other useful presents. Herklots has added *Cassell's Birds*. Even while this preface was passing through the press, we became indebted to Mrs. Gray, of the British Museum, for a valuable collection of sea-weeds, which will receive full notice in our next report.

We certainly have gained system and organization from the opening of the Museum-room, a measure for which the Society feels sincerely grateful to the Council of Marlborough College. A vote of thanks was formally passed at one of our Meetings, and a copy duly forwarded to the Chairman of the Council, but we gladly embrace this further opportunity of recording our sense of what has been a real boon to the study of Natural History in the School. More system, more organization we still want, and shall always (let us hope) continue to wish for more. "Harmony in the whole, energy in the parts," should be our motto.

We may add that the *Report* has been most kindly received, and in several cases very carefully and critically noticed, by several well-known men of science. To Dr. Hooker, of Kew, we are indebted for a new method of tabulating our observations, which was suggested in a letter to the President, acknowledging the receipt of the *Report*.

To the President, our debt of gratitude accumulates. Without his unvarying interest and perseverance we should not be able to make the record we have now done.

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MARLBOROUGH COLLEGE NATURAL HISTORY SOCIETY.

PRESIDENT.

* Rev. T. A. Preston.

SECRETARY.

W. R. Carles.

TREASURER.

T. R. Dumergue.

LIBRARIAN.

R. F. Isaacson.

COMMITTEE.

The Ex-officio Members. R. F. Isaacson.

* C. A. Harrison. * T. R. Dumergue.

EDITING COMMITTEE.

Rev. T. A. Preston.

W. R. Carles. R. F. Isaacson.

HONORARY MEMBERS.

The Rev. the Master. Rev. J. J. Pulleine.

A. Armstrong, Esq. Rev. J. F. Bright.

H. M. Moule, Esq. Rev. J. Sowerby.

W. E. Mullins, Esq. H. C. G. Moule, Esq.

F. E. Thompson, Esq.

MEMBERS.

R. B. Mainwaring. A. C. Hilton.

J. W. Parrington. C. E. Powell.

A. Marshall. J. E. Hilliard.

H. W. Hockin. W. D. Smith.

R. R. P. Hilton. H. M. Hilton.

T. E. Maclean. * G. H. Dawson.

W. E. Bolland. E. im. Thurn.

A. Herklots. E. Almack.

E. H. Carr. A. M. Hardy.

A. P. Hockin. H. G. Baily.

J. H. Johnson. J. C. Palmer.

* F. J. H. Jenkinson. F. W. Head.

* Heads of Sections.

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RULES.

1.—That this Society be called the Marlborough College Natural History Society.

Constitution.

2.—That the Society consist of Members and Honorary Members.

Officers.

3.—That the Officers of the Society consist of a President, Secretary, Treasurer, and Librarian, to be elected from and by Members of the Society.

Management.

4.—That the affairs of the Society be conducted by a Committee, consisting of the President, Secretary, and three other Members of the Society, to be elected from and by Members of the Society; three of whom shall form a Quorum.

President.

5.—That in case of an equality of votes, the President shall have a double or casting vote.

6.—That in the absence of the President, the Committee be empowered to request any Member of the Society to take the chair.

Committee.

7.—That on the occurrence of any election, each member of the Committee have double the number of votes of any other Member of the Society.

8.—That two Members be appointed half-yearly by the Society, to assist the Secretary in Editing the Report.

Secretary.

9.—That the duties of the Secretary be to keep a list of all the Members of the Society, and of all former Members and Benefactors who may wish to receive the Reports of the Society; to summon meetings (when necessary) of the Society; to keep a detailed report of the proceedings, as well as lists of Members and Visitors present at each meeting, and generally to act under the direction of the Committee in all matters connected with the welfare of the Society.

10.—That in the absence of the Secretary from any meeting of the Society, minutes of the proceedings be taken by a member of the Committee, appointed by the President.

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Treasurer.

11.—That the duties of the Treasurer be to collect all sums of money due to the Society; to receive all donations of money; and to disburse all sums payable by the Society out of the funds entrusted to him.

12.—That the Treasurer furnish half-yearly a detailed account of the receipts and disbursements to be audited by the Committee.

13.—That the funds of the Society be placed in the College Bank, and that no money be withdrawn by the Treasurer without the signature of the President to the order; or in his absence, that of the Secretary.

Librarian.

14.—That the duties of the Librarian be to keep a catalogue of the Library, with the names of the Donors; to see that the Library Regulations are carried into effect; to be responsible for the order of the Museum, and when necessary to assist the Secretary in the distribution of the Reports of the Society.

Library.

15.—That any Member of the Society be at liberty to consult any of the books belonging to the Society, but that only certain volumes, to be decided on by the Committee, be allowed to be taken from the room.

16.—That if any Member wishes to take a volume from the Museum, he shall give his name, and the name of the book, to the Librarian, who shall enter them in the book kept for the purpose.

17.—That every volume so taken out be returned by the end of the quarter, but that no book be kept more than one month.

18.—That if any volume be damaged, such damage shall be reported by the Librarian to the Committee, who shall decide upon any further proceeding in the matter.

Museum.

19. That any Member of a section, who is not a Member of the Society, be allowed access to the Museum at such times as it is open to Members of the Society generally, provided he first obtain leave from the President, which leave shall be renewed every quarter, but may be taken away at any time, if the privileges be abused in any manner.

20.—That the same privileges be extended, under the same conditions, to to such other Members of the School who may wish to use the Library and Collections for the purposes of study, provided there be a reasonable excuse for their not belonging to a section.

21.—That in all cases the Museum be used for the study of Natural History alone, and not as an ordinary Reading Room.

Members.

22.—That the election of new Members rest entirely with the Committee.

23.—That every Member pay a half-yearly subscription of 2*s.* 6*d.*, to be paid at the first meeting of the Society in that half-year.

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24.—That if a Member be elected at, or after the Quarter, he shall only pay 1*s.* on Election.

25.—That Members have the right to be present, to state their opinions, and to vote at all general meetings of the Society; to introduce a visitor at general meetings of the Society; to have personal access to, and to introduce a visitor to the Museum; and to have a copy of the Report half-yearly

Visitors.

26.—That on such occasions when the number of those who wish to be present as visitors at the general meetings of the Society is greater than the number of members who attend, the President and Committee shall be empowered to admit two or more each, as shall seem fit.

Honorary Members

27.—That Honorary Members have all the privileges of Members, except the power of introducing a member of the School to the meetings of the Society.

Suspension of Members.

28.—That any Member be liable to be excluded from the Society by the Committee, if, in their opinion, he shall have failed to show sufficient energy in the working of the Society.

Sections.

29.—That sections be formed for the more accurate study of the different branches of Natural History, and that the heads of these sections be chosen by the Committee half-yearly from Members of the Society.

30.—That these sections shall hold meetings as often as shall seem fit to the heads of the several sections, at which any member of the school, with the sanction of the head of that section may attend.

Meetings.

31.—That ordinary meetings of the Society be held once a fortnight, but that the Secretary be empowered to call extraordinary meetings when necessary.

New Rules.

32.—That any Member of the Society have power to propose any new rule or any alteration in an old one, provided the motion be seconded by another Member.

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MEETING HELD AUGUST 24TH, 1866.

This being the first meeting held in the new Museum, a vote of thanks was passed to the Master and Council, for their kindness in fitting up the room for the Society's purposes.

Entomology.

THE PRESIDENT exhibited two boxes of moths, presented by A. Marshall and A. C. Hilton to the College collection.

A. C. ALMACK exhibited a living specimen of *Acrida Viridissima*, a large species of grasshopper.

J. W. PARRINGTON exhibited a specimen of the Musk Beetle, one of the Long horns, captured that day.

G. K. MILLS exhibited Larvæ of the Puss Moth *(C. Vinula)* and Poplar Hawk *(S. Populi)*.

Geology.

C. A. HARRISON exhibited specimens of wood from a submarine forest at Hartlepool.

W. H. BOLLAND exhibited a fossilized nest and eggs.

T. W. MOORE exhibited a piece of the Atlantic cable of 1865.

After the general meeting W. R. Carles was elected to the Committee, *vice* F. C. Lightfoot, and to the office of secretary, *vice* W. W. Dayman, resigned; and R. F. Isaacson to the editing committee. A vote of thanks to W. W. Dayman was carried unanimously.

There were 39 persons present.

MEETING HELD SEPTEMBER 7TH, 1866.

Botany.

THE PRESIDENT passed round a list of the Botanical notices for the past fortnight. Among these were notices of 7 plants, and upwards of 30 localities, hitherto unrecorded. He then passed round a specimen of the common garden Nasturtium *(Tropæolum)*, in which several stalks had adhered together. Also specimens of the following esculent Fungi: *Agaricus Fusipes, Clavaria, Coralloides* and *Cantharellus Cibarius, (Chantarelle.)*

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Ornithology.

A. C. ALMACK made a few remarks on the ornithological notices obtained during the past fortnight, mentioning particularly the finding of a nest of the Yellow-hammer; he also exhibited a stuffed specimen of the Night-jar, and made some remarks on its habits. He then read a short notice respecting the Cuckoo, and asked for facts to prove or disprove the statement that the bird has the power of colouring its eggs, to suit the colour of those of the bird into whose nest it drops them.

Geology.

C. A. HARRISON passed round specimens of *Turrilites Costatus*, *Inoceramus Lamarckii*, *Ammonites varia*, and *Inoceramus Mytiloides*, obtained from the lower chalk beds, at Bignall, near Swindon; he also passed round a figure of the Turrilite, to give an idea of its shell; also a bull's horn, and a piece of charred wood, brought from Moscow by Dr. Fergus, which had been burnt in the fire in 1812, and dug up from a depth of 30 inches below the surface of the ground.

Entomology.

W. W. DAYMAN read a list of notices obtained during the past fortnight, among which were the Kitten Moth *(C. furcula)*, the Purple Hair-streak *(T. Quercus)*, *L. Testacea*, &c., all of which were species new to the College List, and remarked upon the unusual number of larvæ of the Sphinges found this season. He then exhibited the new species, as well as a box of insects, forming part of his donation to the College collection.

T. E. MACLEAN exhibited three specimens of the Diamond beetle.

H. M. HILTON exhibited a specimen of a locust taken in Kent.

A. C. ALMACK then read the following paper on the

SONG OF BIRDS.

The first question that naturally arises in the mind of anyone reflecting on the song of birds is whether it is innate or acquired. The opinions of naturalists on this point vary very much, and I will try to put before you now the principal arguments used on both sides.

First, it is true that birds in confinement will learn the song of others with which they are constantly kept. Such is very frequently the case with the canary, but before this can be taken as a proof that song is innate, it ought to be shown to be always or almost always the case. Again, it is objected to this argument that the song is never purely that of the bird imitated, but always retains traces of the natural song of its own species. Many persons contend that though this may be the case, yet the very fact of another bird's song being acquired and habitually sung is sufficient to show that song is not absolutely innate.

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Another argument used by Colonel Montagu in his Dictionary is that, if birds naturally acquired the songs they hear, the young of birds would constantly be acquiring that of some species which has its nest in the same bush or somewhere near. Of course this argument is strong, but not so conclusive, I think, as Colonel Montagu seems to regard it. For though it is by no means a rare occurrence to find nests of the same and different species close together, yet we must not forget that birds do not generally sing in the bush where their nest is, but at some distance from it. And again it is little to the point, when we consider that, after the young birds reach an age when they would be likely to begin to sing, the parent birds are in most species quite silent.

Of course we are tempted to think of our own case, and try to reason from the fact that we acquire any language and are not born with it. But the fallacy of resting for a single moment on this reasoning will appear when we consider that people talking all languages do not reside in the same place in great numbers as birds which, though they sing different songs, still inhabit the same wood. Here, then, will come in the great question, whether birds distinguish members of their own species by sight or by the voice. Many persons think that it is by the voice, because there are species so exactly similar to one another that they cannot be distinguished outwardly. For my own part I cannot see why these two should be the only means they have of discerning members of their own species; but am inclined to think that they are endowed with some instinctive power which enables them to do it, and also that their song is innate, and may be changed to that of other birds which they hear in a state of domestication, when birds as well as all animals can hardly be said to be subject to the same laws as when in a state of nature.

Having dismissed this question, let us now proceed to consider how the song of birds is produced, and why the voice is proportionally so much greater in them than in almost any other creatures. At the base of the windpipe are two tubes called the bronchial tubes, which lead into the lungs. At the entrance to these tubes are two bronchial muscles, by the movement of which, as they contract and expand, the modulations of the voice are made. The beak acts merely as the air-holes of a flute, the muscles and the windpipe being the real musical organs. The windpipe is less required for breathing in their case than in that of any other creatures, in consequence of the general diffusion of air-cells and breathing tubes over the whole frame.

I shall now proceed to make a few remarks on the causes of song among birds. The generally received opinion seems to be that it is caused by the stimulus of love. The ground for this view consists in the fact that the song is stronger and much more constant at the time of incubation than at any other time. Such is certainly the case with very many of our summer visitants, such as the nightingale, the blackcap, and others. Most of these birds, too, it has been noticed, use their song as a means of attracting the

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female, to attract whom they perch themselves on some high bough and pour forth all their melodious powers, which fact certainly does seem to point to the song being caused by love. No sooner does the nightingale make its appearance (which the male does invariably before the female), than it begins its powerful song seated on some conspicuous branch, though at other times so timid and retiring a bird. Colonel Montagu states that after the female has begun her nest the male sings very little till after the first brood are hatched and fledged, when he again pours forth his melody. In the mean time he is busy helping the female, in some cases helping to build the nest and hatch the eggs, and almost always helping to feed the young. All these facts are hardly to be doubted when announced by such an authority as Montagu, but yet I cannot help venturing to remark, that either there must occasionally be more nightingales about us than we think, or else that the song must be continued longer than is necessary to attract the notice of the gentler sex. Of course I only mention the nightingale as the type of our visitant songsters.

Against this theory that song is merely stimulated by love there are many almost overwhelming arguments. There is the natural one that caged birds sing all the summer through, which may be met in two ways, viz., that caged birds can hardly be expected to act as if in a state of nature, and in a much more satisfactory way, by showing that birds even in a wild state may be forced to continue their song beyond their natural time. An experiment was once tried of separating a Redstart from its mate. The cock bird immediately began his vociferous calls, which he had not employed while the female had been sitting on her nest, and a new mate was soon attracted and a brood reared. The same experiment was tried with a nightingale, attended by the same result. Here again we see from these experiments a very strong corroboration of the above theory. But yet we must remember that our remarks have only extended over the period of the year when breeding goes on. That birds only sing at this time is a very erroneous supposition, as the following table (drawn up from personal experience by a gentleman living near Dublin) will show:—

Out of 41 songsters	16	...	...	...	...	sing in	January.
,,	25	...	...	...	...	,,	February,
,,	32	(including 2 summer visitants)				,,	March.
,,	37	,,	7	,,		,,	April.
,,	39	,,	8	,,		,,	May.
,,	38	,,	9	,,		,,	June.
,,	18	,,	8	,,		,,	July.
,,	14	,,	3	,,		,,	August.
,,	8	,,	3	,,		,,	September.
,,	9	,,	1	,,		,,	October.
,,	10	...	...	...	...	,,	November.
,,	11	...	...	...	...	,,	December.

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Tables of this sort are of the utmost use, but they ought to be made in many places to obtain any real idea of the general numbers throughout the country, and it would be very valuable to us could we draw up one for Wiltshire. The one given above, however, conveys a fair idea of the number of songsters we have per month, our whole number being about 50.

Now the Robin sings all the year round in the most indefatigable manner, except for about six weeks in the height of summer. His song generally commences about the first week in August and goes on till the following June, and may constantly be heard, as we all know, in the frosty month of December. The Wren, too, is an early winter songster, first singing in November; the Wagtail is another, though he does not begin so early or sing so frequently. According to a list I have found given by a gentleman living at Esher, in Surrey, the song begins in January and lasts till July. The Common Thrush, too, is a very constant singer, and may often be heard singing on fine days in the winter. Last year we had a notice recorded of one singing on November 19. I have notices besides of their song being heard on Jan. 10, and Feb. 2. Besides these birds there are several others whose song is often heard in the autumn and winter months, viz., the Skylark, which may be heard in January and the autumn months, the Missel Thrush, Blackbird, Hedge Sparrow, and Chaffinch, which sing in October and September, and begin their spring song as early as February.

"That the song of birds is the language of love," stated by a naturalist in the *Zoologist*, "and as such only to be heard during the pairing season, is an old theory, but not the less incorrect for its age," has, I think, been shown by the facts above quoted, for out of the many species we find singing after July, but three or four build second nests, and we know ourselves how rarely we find a nest after that month. Last year and this we have had very late notices of the Yellow-hammer's nest, one on the 3rd of September and the other in August, but these are the only two we have. I believe myself that song is mainly, if not entirely, dependent on a joyousness and lightness of spirit, whether produced by genial weather, abundance of food, love, or any other cause, and, in fact, that a bird sings under the influence of the same natural impulse as that which causes the yelping of the playful puppy, or the whistle of the idle school-boy. Witness birds in confinement: supply them with sufficiency of warmth and light, and you may have them singing at any period of the year, and by day or night; the thrush singing as clearly and sweetly by the glare of the gas lamp as in the bright sunshine.

Of course there is an objection to this solution of the question, viz., why, if such is the case, does the song ever stop altogether for a considerable time, as there are fine sunny days in all months of the year. What are the reasons for these songless periods we can hardly hope to determine, as we cannot even form a probable guess on the subject, if we set aside the supposition that song

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is caused by love, which I think we have abundant reason for doing from what has been said above.

Let me now give you a comparative table of the songs of ten of our commonest English songsters. Perfection being represented by 20, we find them marked as follows :—

	Mellowness of tone.	Sprightliness.	Plaintiveness.	Variety of notes.	Degrees of compass and execution.
1. Nightingale.....	15	12	20	16	20
2. Song Thrush	8	9	10	11	12
3. Blackbird	6	2	10	6	10
4. Skylark	4	12	3	10	10
5. Blackcap	10	14	2	8	9
6. Woodlark	16	2	7	6	9
7. Titlark	7	6	1	5	7
8. Robin	4	10	11	8	10
9. Garden Warbler...	5	7	4	6	8
10. Missel Thrush.....	4	6	3	4	6

Many persons of course would disagree with this order of our songsters, and would put the Blackcap earlier, but no one can doubt that the Thrush is fully entitled to stand second to the Nightingale, if he does not even dispute the first place with him, which I am inclined to think he would do were he such a rarity as the Nightingale.

Let me now say a few words on each of these ten songsters, confining myself more especially to their singing powers and habits.

The *Nightingale* must of course come first. It owes its name to its habit of singing in the night, *gale* being a corruption of the Saxon word *galan*, to sing. It makes its appearance in England about the latter end of April or the beginning of May, according to the mildness of the season; and the males invariably arrive ten or fourteen days before the females. One of the most remarkable facts about this bird is the curious circuit it makes in its migration to this island. Very rarely indeed is its song heard north of Yorkshire or west of Devon and Dorset. They seem to be most numerous in Hampshire and Kent, and the counties round the metropolis. Much has been said on this subject, and it has been conjectured that some minute insects on which it feeds must be the cause of its partiality for those counties. This bird expresses his different emotions by suitable and expressive tones. The most unmeaning cry, and one which he utters when alone, appears to be a simple whistle. In anger, jealousy, rivalry, or any extraordinary event, he can utter a very hoarse and disagreeable sound, like that of a jay or a cat. The strength of his vocal organ is indeed wonderful; but it is not so much the strength as the compass, flexibility, variety, and harmony of his voice which make it so admired by all lovers of the beautiful in sound. At times dwelling for minutes on a strain of

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only two or three melancholy notes, he begins in a subdued voice, and then gradually swelling out to the highest point of strength, ends it by a gradually dying cadence. It sings most beautifully on its first arrival, but only continues in song for three months at the most. The song of the female is similar to that of the male, though not so powerful. It may be heard at almost any time on a calm night, though some naturalists have stated that they are silent at a certain time. The shutting of a neighbouring gate, the striking of a church clock, the passing of a cart, or even the footsteps of passengers walking on a hard turnpike road, will frequently cause it to commence singing: incidents which one would suppose would rather disturb so shy a bird. He chooses two or three trees not too near his nest, for fear of its being discovered, on one or other of which he sits and sings constantly, never allowing one of his own species to approach the nest. The bird is said to sing as sweetly in confinement as in a state of freedom, and I have found an account of one that sang with all its natural power and sweetness in a dark cellar in the High Street of Edinburgh, where no light was admitted but what came through the open door: the atmosphere was charged with the fumes of tobacco and spirits: it was a place where carriers lodged or put up, and the heads of the porters nearly came in contact with its cage, which hung at the foot of the staircase.

Of the *Song Thrush*, which comes next, I need hardly say anything, as its habits must be known to most persons present. It is very fond of singing from about three in the afternoon till sunset, perched on the top of some high tree. The seasons at which it sings I have stated above.

The next on our list is the *Blackbird*, whose song commences early in the spring, and is a shrill kind of whistle of various notes, most brilliant in the sunshiny intervals between showers in May. The following is a very curious anecdote relating to the vocal powers of this bird:—One that was kept near a farm house acquired the power of imitating the crowing of a cock, which it used to do to such perfection that all the cocks within hearing would answer it.

We now come to that universal favourite the *Skylark*. We all know its song well. No other bird sings on the wing to anything like the same extent. Very few birds sing at all then; but the Skylark does so always. As it mounts upwards it pursues a spiral course, gradually enlarging the circles; its flight, too, is by no means smooth and regular, but performed by a succession of leaps. The accordance of the song with the mode of the ascent and descent is also worthy of notice. When the volutions of the spiral are narrow and the bird is changing its attitude rapidly the song is partially suppressed, and swells as the spiral flight widens, sinking again as it contracts, so that, though the notes may be the same, it is only when the lark is poised at the same height that it sings in an uniform key. Its song swells as it ascends and sinks as it descends, and even if it takes but one wheel in the air, as that wheel always

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includes either an ascent or descent, it varies the pitch of the song. It sings from February to October.

The *Blackcap* arrives about the beginning of April, and continues singing from that time to about the middle of July. It is very fond of gardens, and its song is little inferior to that of the Nightingale in many persons' opinion, though possessing less variety. The bird generally sings seated on a high branch, with its head much elevated. In trilling it excels all songsters, and in the swells and cadences of the trill, the throat experiences very strong convulsions, and the whole bird appears excited.

Next is the *Woodlark*, whose song is almost unequalled in mellowness, and excels that of the Skylark in richness of tone. It occasionally sings on a tree, near which it loves to take up its quarters. Its style of song is altogether much like that of the Skylark, and, according to White, continues from January till September.

The *Titlark* is a merry little bird, singing from May to the end of July. Its song is between that of the Skylark and Woodlark, without the power and variety of either. It is the same bird as the Meadow Pipit.

About the *Robin* no more need be said.

The *Garden Warbler*, as its name indicates, inhabits the same places as the Blackcap, for which it is often mistaken, as the eggs and nest are almost precisely similar. It arrives like most of the others about the end of April, or beginning of May. Its song consists of some notes sweetly and softly drawn, while others are quick, lively, loud, and piercing, and it has a whistle something like that of the Blackbird. It is the same as the Fauvette and greater Pettychaps.

Last comes the *Missel Thrush*, which is the largest songster we have. He sings generally during a storm, or in a lull just after it.

There are many other singing birds, though of minor importance, such as the Linnet, Wren, Goldfinch, Chaffinch, and others, but I have omitted them, as they would make my paper too long, and, perhaps, too dry.

The following letter connected with the above subject appeared in the *Marlburian* of Sept. 26:—

"Sir,—May I ask for a few lines' space to say a word or two on the singing of birds, and especially on the Cuckoo's note? These remarks were intended to be made at the last meeting of the Natural History Society, but press of other subjects made it necessary to omit them.

On the singing of birds in general, it is worth remarking, that no connexion whatever exists between it and our own human, artificially modulated, music. To be fond of Beethoven or Mozart is not necessarily to care for the *avium concentus in agris*, nor *vice versa*. It took many centuries to evolve

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some of the simplest, and now most familiar, combinations of our modern harmony. In birds' songs there is no harmony in the ordinary sense, and very little of what the musical composer knows as melody.

Of the Cuckoo in particular, it has not perhaps been often remarked that its note is *always* a musical *third*. This forms an exception to the general character of birds' songs; I believe that, excepting in the case of young birds, the cuckoo never "sings his name to the hills," in an interval so large as "a minor fourth," or so small as a "whole single tone." In other words, he always sings in a major or a minor *third*. Observe that the third is *major* as well as minor. This contradicts a whimsical theory which is sometimes laid down, that *all* natural sounds (wind whistling, water rippling and plashing, birds singing) are modulated in minor intervals. So far as there is modulation at all, it is purely accidental, and leads to major quite as often as to minor intervals.

Your obedient servant,

H. M. M."

After the paper the Society proceeded to pass some new rules submitted to them by the Committee.

There were 43 persons present.

MEETING HELD SEPTEMBER 10TH.

This was an extraordinary meeting, called to complete the passing of some new rules, submitted to the Society by the Committee.

MEETING HELD SEPTEMBER 21ST.

In the absence of the President, the chair was taken by H. M. Moule, Esq., who read letters from Professor Owen, Professor Newton, and the Rev. C. Pritchard, exhibiting warm interest in the Society.

Geology.

W. D. SMITH exhibited *Cardium dissimile, Trigonia incurva, Ammonites varians,* and *Ostrea,* from the Portland Beds at Swindon.

Botany.

In the absence of the President there was no report.

W. W. DAYMAN exhibited specimens of the Lady's Tresses (*Neottia spiralis*), found near Martinsell.

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Ornithology.

A. C. ALMACK exhibited specimens of the Snow Bunting, in winter plumage, and of the male and female Night-Jar.

E. DE THURN exhibited a skin of the Green Woodpecker.

Zoology.

H. W. HOOKIN exhibited the fins of the Flying Fish (*Exocetus volitans*).

Entomology.

W. W. DAYMAN read out a list of captures made during the past fortnight, and passed round two boxes of Moths, presented to the Society's collection by the Rev. J. Greene.

Archæology.

H. M. MOULE, ESQ. exhibited a £5 piece, coined in the reign of George III.

T. W. DUMERGUE exhibited a box of coins.

The Librarian then passed round some books which had been presented to the Society. These were "Ootheca Wolleyana," Part 1, presented by the author; "Cassell's Birds," by A. Herklots; and "The Entomologist's Monthly Magazine," by the Rev. T. A. Preston.

G. K. Mills then read the following paper on

THE ICHNEUMON FLY.

"Big fleas have little fleas
Upon their backs to bite 'em,
And little fleas have lesser fleas,
And so *ad infinitum*."

The subject which I propose to speak about this evening is one which doubtless has more interest for the Entomological portion of our Society, yet I think the rest of you may be interested to hear a few facts relating to the habits and life of these insects, which exercise so large an influence over the Entomological world. I was induced to choose this as the subject of my paper chiefly by the fact that for many years my tender hopes of a fine Poplar Hawk or Puss Moth have been so very frequently blighted by the appearance of one or more fine Ichneumons from the Chrysalides, of which I was so proud, and which I had watched so carefully. I remember three years ago being greatly disgusted at the large amount of these insects which I unwittingly reared, principally from Puss-moth Chrysalides, so I naturally wanted to find out something about my enemies, and the result of my investigations I now venture to read before you, hoping you may benefit by my sad experience.

The name of Ichneumon has been given to these insects from the similarity of their habits to those falsely attributed to the quadruped of that name,

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namely, that of depositing its young in the body of the crocodile, the entrails of which are by degrees devoured by the parasite. Other old authors have named these insects *Muscæ triplices*, from the shape of the ovipositor; while others called them *Muscæ vibrantes*, from the constant vibration of their antennæ, which enables them in some manner to acquire a knowledge of their food, and of the objects fitted for the reception of their eggs. These insects are of vast importance in the economy of nature, by preventing the too great increase of different species of insects, especially of the caterpillars of butterflies and moths, of which they destroy a great number, it having been observed that a superabundance of any species of insect is attended by an increased production of its parasitic enemies.

The shape of an Ichneumon is something like that of a wasp, only much thinner; but its chief characteristic is its *ovipositor*. This instrument is at the extremity of the abdomen, and is contained within two pairs of demi-sheaths. It is called the *terebra*, or borer, and is itself formed of three parts, by the union of which a passage is formed for the protrusion of the egg. In the act of oviposition the *terebra* is bent beneath the body of the insect, which then works itself from side to side, giving the ovipositor a kind of saw-like movement. There is scarcely a tribe of insects which is not attacked by one or other species of this tribe. When the Ichneumon sees a caterpillar which it thinks will be a suitable home for its young, it alights on it, and inserts its ovipositor into its flesh, and, in spite of all the efforts of its victim, does not desist till it has deposited an egg there, and secured subsistence for one of its future progeny. Sometimes she finds out by instinct that some other Ichneumon has forestalled her; then, as if aware that the same caterpillar will not suffice for the support of two, she leaves it and searches for another. In the case, however, of some very minute species of Ichneumon, as many as 150 can subsist in a single caterpillar. It is not, however, only caterpillars that they attack, for they reach the *spider* in his web, they discover the hole of the *carpenter bee*, and though they cannot enter the cell, they introduce their long ovipositor, and deposit an egg in the helpless grub; they kill the *weevil's* young in a similar way, and so are a perfect god-send to the farmer; they can pierce through the *galls*, and give the hapless insect within a young friend to take care of; and lastly the *wire-worm* often falls a victim to their marvellous instinct. The larvæ hatched from the eggs thus deposited find their food in the body of the caterpillar or grub; but the wondrous instinct of these larvæ makes them carefully avoid touching the *vital organs* of the creature they inhabit, and live only upon the fatty matter, until they attain their full size, and are ready to assume the pupa state, as if they were aware that their own existence depends on that of the insect on which they prey. Thus the caterpillar continues to the last to eat and live and move, apparently little injured, and only perishes when the grub inside no longer requires its aid. When these

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larvæ are ready to become pupæ they pierce the skin of the caterpillar, spin cocoons beneath its body, and then turn. In some cases, however, they use the skin of the dead insect as a cocoon. Then in a short time the pupa of the caterpillar discloses not a moth or butterfly, but one or more full-grown Ichneumons.

The perfect insects are found flying amongst trees and plants, and especially among the heads of flowers, from which they get the honey on which they live. Some species are found on trunks of trees and stumps of wood, evidently searching for larvæ wherein to deposit their eggs, as this is all the object of the Ichneumon's life, while those which have short ovipositors seek such larvæ as have no domicile, for the same object. When taken in the fingers they immediately attempt to sting, causing a slight irritation for the moment, but so trifling that it is evident they can emit no very powerful poison.

Some Ichneumons glue their eggs to the skin of their prey instead of burying them in its body. One kind places its eggs on the larva of a large bettle, upon which, when hatched, the young maggot feeds by introducing about half its body into its victim, so that it is half in and half out. Another tribe, imitating the cuckoo, contrive to introduce their eggs into the nests of bees and other insects; they therefore are constantly on the watch, and the moment the unsuspecting mother leaves her cell to get food or materials, they glide in and leave an egg to assassinate the larva by its side.

In fact there is scarcely an insect in the world which, in its larva state, is not exposed to the attacks of one or other of the Ichneumon species; even their eggs are not safe. I have also found it asserted that they deposit their eggs in the body of the winged grasshopper, the interior of which is at length eaten up by their larvæ, and at the proper season, hundreds of grasshoppers in this condition may be found with just strength enough remaining to flutter to a tree or fence, and with a dying effort to fix their hooked feet so firmly as as to retain their position long after death.

Hitherto no species of this family has been observed which is not parasitical; though some doubtful instances are brought to prove the contrary, their evidence is hardly conclusive.

The developement of these parasites within the bodies of other insects was for a long time a subject of much speculation amongst the earlier philosophers, who conceived it possible that one animal had occasionally the power of being absolutely transformed into another. One writer on this subject calls it "a thing very wonderful that 545 flies of the same species were produced from four Chrysalides of a butterfly, so that the life and motion of these seem to have *transmigrated* into those of the 545 others."

The larvæ of these insects are destitute of feet, having a soft, white, fleshy, and nearly round body, with fleshy tubercles on the sides. They generally

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do not destroy their victim in the larva state, but allow it to become a pupa, in the body of which they turn, and do not appear till they are perfect insects.

The larvæ of the majority spin a silken cocoon, in which they pass their pupa state; these cocoons are sometimes found in a mass together, and are often enveloped in a general covering of yellow or white glossy silk, forming a large oval mass, which may be often seen on railings, walls, plants, &c., and in one species the cocoons are arranged in a symmetrical manner, like the cells of a miniature beehive, without any outside covering. Other cocoons are found suspended to leaves or twigs by threads, sometimes three or four inches long, and others again turn to pupæ in the hardened skin of the Aphis, (such as "the blight" of the rose, &c.) when they have eaten the interior. Linnæus says that there are 77 species of Ichneumon, but I find that Stephens gives the number as "several hundreds," shewing the large number which have been discovered since Linnæus' time.

The English specimens are as a rule not more than an inch long, and generally less, but one exotic species is found three or four inches in length.

The thing that seems to be most worthy of notice in this interesting family is the parental instinct of the Ichneumon, shewn in providing a safe home for its eggs. How perfectly wonderful is the power they have, first of finding their prey, then of forcing it to nourish their young larvæ, till it at last falls a victim to their continued ravages. As a curious parallel I may mention here the way the gad-fly, though it does not belong to this family, provides for her eggs. Its larvæ have to live in the stomach of the horse. How is she to get them there? Well, she flies round the animal, and poises her body while she glues a single egg to one of its hairs, then repeats the process till she has fixed many hundred eggs. These in a few days hatch into little grubs. Whenever, therefore, the horse licks any part of his body where they are, they stick to his tongue, and so pass into his mouth, and thence to his stomach. But you may say, "The horse can only reach a small part of his body with his tongue, what becomes of the other eggs?" The gadfly places her eggs only on those parts which the horse can lick, confining them in fact almost exclusively to the knee or shoulder, which he is sure to lick. Does not this almost cast into the shade the boasted reason of man?

There were 44 persons present.

MEETING HELD OCTOBER 5TH.

Geology.

C. A. HARRISON gave a Report of the proceedings of the Section during the past fortnight, and exhibited some Saurian remains from Portland Island, and *Cerithium Portlandicum*, found at Swindon.

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W. R. CARLES exhibited a horse's tooth and some pieces of iron, found under a stone of 30 tons weight near the "Devil's Den," kindly lent by Mr. Neate.

T. E. MACLEAN exhibited a shell coated with sand, by the action of salt water on iron.

Entomology.

W. W. DAYMAN read a Report mentioning the discovery of five species new to the College list, and exhibited the most interesting species captured, among which were the following:—*Ennomos Tiliaria, Epione Apiciaria, Anthocelis lunosa, Phibalapteryx lignata, Pterophorus plagiodactylus*, &c.

C. E. POWELL exhibited the larva of the Death's Head moth *(A. Atropos)*.

A. MARSHALL exhibited specimens of the hornet, wasp, and *Sirex gigas*, the latter, an insect in its larva state very injurious to fir-trees.

THE PRESIDENT exhibited a specimen of *Stenepteryx hirundinis*, a parasite of the swallow, remarkable for its large size, which is such that two or three are sufficient to cause the death of the bird; found by the Rev. A. G. Bleeck.

Ornithology.

G. H. DAWSON read a report, and exhibited a specimen of the Kingfisher.

Botany.

THE PRESIDENT exhibited specimens of *Geaster fimbriatus*, a rare fungus, found by A. R. Wiggin in the Forest; also of *Spumaria mucilago*, a fungus unusually abundant this year; slices of Yew and Ash, aged respectively 117 and 51 years; also a specimen of Mistletoe on Apple, to shew the damage caused by the Parasite.

Mineralogy.

THE PRESIDENT exhibited a large specimen of Malachite.

Zoology.

THE PRESIDENT exhibited a young turtle from St. Helena.

W. W. DAYMAN then read the following paper on

ANTS.

In the present century when every form of government is being canvassed, it would be refreshing to a statesman to turn his eyes to a spot in the world of nature, which could gladden him with the sight of one form of administration in which all is harmony and concord, one, too, subject to no revolutions, and in which, each individual has a due influence on the welfare of the commonwealth, and which, therefore, we may say has discovered the golden mean of social happiness. Let such an one pause for one moment to reflect on the economy of an Anthill, ere he passes it heedlessly by, and he will see that ideal form of government I have described, developed in the shape of a constitutional monarchy. Well therefore may Kirby and Spence class ants

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among their "Perfect societies of Insects," although by this term they mean to denote, merely that they are one of those societies who continue to live together throughout their whole existence, as opposed to imperfect societies, such as those of the caterpillars of the *Procession Moth*, of *Whirligig Beetles*, so often visible on the surface of ponds, of *gnats*, and others, which to quote the words of Mr. Kirby "are either associated during part of their existence only, or else do not dwell in a common habitation, nor unite their labours to promote a common object."

In treating of ants and their habits, we must speak first of the ants themselves, and mention the various classes or sexes, for these terms are synonymous in ant life, as also in the case of bees. There are then three sexes, viz., males, females, and neuters or Workers. Of these, the two former merely serve the purpose of continuing the species, the whole duty of the structure, defence, provision, &c, of the state, devolves upon the *neuters*, *workers*, or 3rd class. In some species the *workers*, are subdivided into other classes, and, in the case of a Mexican species, while some of the workers are of the usual form, others have their bodies greatly enlarged for the apparent purpose of keeping up a constant supply of honey, the use of which has not as yet been discovered. The average, and indeed by far the greater number of species, follow the above classification, viz., males, females, and workers or neuters.

Many of you must have noticed, at this season of the year, vast swarms of winged black ants, rising and falling in the air, which are precisely like imperfect societies of gnats, and are composed entirely of males and females. On the termination of this flight the males die immediately, sometimes covering paths or streams to such an immense distance that, in one instance, they covered a space from 5 to 6 miles long, with a heap 6 inches high, and eight or ten feet broad. The females do not long survive them; with the exception of a few which are still kept in the anthill for the purpose of laying eggs and preventing the society from dying out.

These females thus detained become Queens, much in the same way as the female wasps, and while detained are treated with the utmost kindness and attention by the workers, who however take good care that they shall never leave the nest. For this purpose a single sentinel is posted to watch the Queen, who takes up his position with his hind legs on her body, and his forelegs on the ground, and in this position he remains, until relieved by another. But no sooner has the queen finished oviposition, than the ants crowd round her and pay her the most attentive homage, feeding her, caressing her, and even carrying her about on their antennæ, in short treating her as a beloved sovereign, and rivalling the bees in their respect for royalty.

Such are the comparatively uninteresting annals of the lives of the males and females, the two first sexes or classes, comparatively uninteresting

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I say, because it is the 3rd class or workers, who exhibit the most striking instances of sagacity and foresight, and therefore to them I shall devote the remainder of my paper.

This class forms by far the largest portion of the anthill, and on them devolve the duties of rearing the young, building the anthill, carrying on offensive and defensive operations against their neighbours, and managing all the internal economy of their commonwealth. They possess a language the expression of which is supposed to reside in their antennæ, which they move with marvellous quickness: and which they use also for feeling their way, testing wholesome or unwholesome food, recognizing a friend or an enemy, and generally for communicating their feelings and desires.

And now let me speak of the wars of the ants. These generally take place between nests of different species, but in some instances war has been seen to be carried on between ants of the same race: indeed in the case of one species intestine revolutions occur, and the minority then form a feast for the majority. When an ant attacks another, he does so in the following way: raising himself on his last pair of legs, he bends his abdomen between them, seizes his opponent with his jaws, and injects into the wound thus caused a venomous fluid, called Formic Acid, (which is much used in physic).

Besides these wars, they actually make "razzias" on other nests, for the sole purpose of obtaining slaves—the only instance yet discovered in Nature, where one species makes another his servant. This astounding fact might well appear a fiction, were it not attested by M. Hubner, who has made Ants and Bees his especial study, and has cast more light on their habits than any other naturalist, before or since. He affirms that the Red Ants make forays into the nest of the Black Ant, (who are mere pigmies compared with their invaders), and generally contrive to carry off a pupa of the black species a-piece. These they rear in their own nest to be "hewers of wood and drawers of water." Sometimes, though very rarely, it happens that the Black Ants manage to defeat and drive away their enemies, by their numerical superiority.

No less striking, again, are their habits in peace. In the early part of April, when the sun is shining warm and bright, they may be seen basking in huge masses on the outside of the ant-hill, or playing with one another, and carrying one another about on their antennæ.

Ants frequently make migrations from their old nest to some more suitable spot, and on these occasions they act in the following manner. The finder of the new locality returns to the parent nest, and picks up a friend on his antennæ, and carries him off to the new spot: here he drops him, and the ant, thus unceremoniously treated, himself joins the other as recruiting sergeant. This process is repeated, until a sufficient number are collected to form a new nest.

Perhaps, however, the most extraordinary trait of ant character is their

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appearing on the stage as a pastoral people, whose flocks are kept solely for the milk, or rather its equivalent, which they afford. Everyone is, I think, acquainted with the little green Aphides, technically termed "blight" by gardeners and farmers. These are the "cows" of the ants, and the process of milking them is as follows—The ant goes up to one of these Aphides, and proceeds to pat it on each side alternately with its antennæ: this causes the Aphis to emit a drop of sweet sap derived from the plant juices it has imbibed which the Ant sucks in. Astonishing as this may appear, yet it has frequently been observed; moreover, the Ants guard these Aphides most carefully, and even in some cases convey them to their nests, and keep them close at hand. Nor are these Aphides the only cows they possess: it is a fact well known to all collectors of Beetles that an Ant's nest is a rendezvous for many species rare elsewhere, and a prolific field for investigation: it is more than probable that these beetles are kept entirely for this purpose by the Ants, who never will suffer stranger insects to intrude into their formicaries.

A mistake has originated with the ancient poets, and has been continued down almost to our own time: I mean the mistake of supposing that Ants lay up a store of food in the summer as a provision against the winter: and the Ant has been commended in consequence by Virgil in the well-known lines in the IV. Æneid. This mistake is caused by persons seeing Ants hauling along straws, &c., &c., to their nests; but these are only for immediate use, and not laid up as a store. Yet Ants, even if they do not attain to this pitch of foresight, might well share the palm of industry with Bees, whom they closely resemble in their habits and general government.

Ants have been the subject of no few strange stories. Herodotus, for instance, tells us of Ants which, though not so large as dogs, were yet larger than foxes, and lived in a desert, the sand of which contained a great quantity of gold, and which sand they threw up in making their ant-hills. This sand, he says, is much prized by the natives, who have recourse to the following means in order to obtain it. Each man yokes together three camels, two males on the outside, and a female (who has been separated from her young for the purpose) in the middle. He then mounts on the female and sets off to the place, taking care to arrive in the morning, as owing to the intensity of the heat at that time all the Ants are underground. Here he dismounts, and after filling two bags as rapidly as he can with sand, rides away immediately, for the Ants at once rush out and give chase. The female camel remembering her young one rushes off without ever flagging; but the males cannot go so fast, and are let loose in order to sate the fury of the ants, while the man escapes.

Another fable, current among the Mahometans, is that when all creatures were bringing their presents to Solomon, the ant dragged a locust to the foot of his throne, and was preferred to the other animals, as having brought something so much larger than itself.

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Lastly, perhaps the most curious fable is that Ants when making their roads use their Formic Acid for the same purpose as Hannibal did vinegar. Both stories probably contain an equal amount of truth.

T. R. Dumergue and C. A. Harrison were elected to the Committee in the place of G. K. Mills and W. W. Dayman; and R. F. Isaacson Librarian in place of A. C. Almack.

A vote of thanks was passed to A. C. Almack, W. W. Dayman, and G. K. Mills, on leaving the School, for their services to the Society.

There were 38 persons present.

MEETING HELD OCTOBER 19TH.

Entomology.

F. J. H. JENKINSON gave a Report of the proceedings of the Section.

Geology.

A Report was read by C. A. Harrison, who exhibited some fossils collected by D. Soames, among which was a specimen of *Ammonites Splendidus.*

THE PRESIDENT exhibited some volcanic dust, from an island which appeared for a short time in the Mediterranean.

Ornithology.

G. H. DAWSON gave a Report, mentioning particularly the appearance of a flock of Crossbills, about 12 in number, which had been seen in the neighbourhood of Martinsell by J. W. Parrington.

Zoology.

A. MARSHALL exhibited two Tiger's claws.

W. R. CARLES exhibited a molar tooth of an Elephant.

THE PRESIDENT exhibited a specimen of the Common Bat, and also a large snail-shell, (a species of *Helix*), from Surinam.

Archæology.

THE PRESIDENT exhibited an imitation Egyptian god, purchased near the Great Pyramid, and a household god, from a tomb in the island of Ægina.

Botany.

E. IM THURN exhibited a collection of upwards of 60 species of Fungi, comprising about 6 species of *Clavaria, Craterellus cornucopioides,* and different kinds of *Xylaria, Bovista, Dædalia, Boletus, Coprinus,* &c.

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A. MARSHALL then read the following paper on

THE STRUCTURE AND HABITS OF THE MOLE.

(Talpa Europœa).

I have chosen Moles as a subject for my paper, because Zoology has been less studied by the Society than the other branches of Natural History, and because Moles, living as they do under ground, are perhaps the least known of our common English mammalia, and therefore the better subject for a paper. *Talpa Europœa* is the only mole found in Great Britain, although there are the Scallops, or Shrew Moles of North America, the Shining or Changeable Mole of the Cape, and the Radiated or Star-nosed Mole of Canada; but I shall confine myself strictly to-night to the common British species, as this is the only one that is likely to be at all familiar to us.

As regards the structure of the Mole, the arms are short and of great strength, terminating in broad solid paws, and, from their shortness, are admirably adapted for shovelling out the earth, for if they were longer the earth would be constantly falling in, and so prevent the frequent repetition of its strokes. Compared with these the hinder parts and legs are small and feeble, and so offer no impediment to its course. The teeth are 28 in number, and, like those of all insectivorous animals, extremely sharp. The tongue is as large as the mouth will hold.

Some people assert that the Mole has no eyes, hence the expression "as blind as a mole," but it is not blind, as I have seen its eyes, although they are very small. In order to satisfy himself on this point a Mr. Le Court made two openings in a dry tiled drain, and caused some moles to be introduced successively at one end, while he placed himself at the other. If he stood quite still, the mole soon came out and escaped; but if he only moved his finger it stopped and turned back.

The idea that it has no eyes arose probably from the fact that by a peculiar muscular organisation it has the power of withdrawing them beneath the fur; were this not the case they would be frequently damaged while the Mole is making his excavations, by the earth falling into them.

Mr. Le Court also tried an experiment in order to discover whether a mole can hear. Having fixed sticks at short distances apart, in a very long mole run, he then introduced a horn at one end of the run, and blew down it. This frightened the mole, which set off at such a tremendous pace that Le Court's friends, placed at intervals along the run, agreed that the animal went as fast as a horse can trot.

The ear is of peculiar formation, having no external parts as is the case with human beings, but being a simple opening, capable of being closed at pleasure, which like the eye excludes particles of earth.

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As regards its power of smell opinions are much divided; it is generally considered to be very acute, although many moles kept in confinement have seemed to be almost deprived of it.

Moles sometimes feed on birds and mice, but their usual food is worms and other insects, which they eat in great quantity. I have an anecdote in proof of this last statement. The Rev. J. G. Wood, having had a live mole given to him, kept it in a large box, and placed a worm several times within one-eighth of an inch of its nose without attracting its attention. This seems sufficient proof that the mole's power of smell is very limited, but if its snout or paw touched the worm, it pounced upon and eagerly devoured it. This mole eat so fast that Mr. Wood had considerable difficulty in finding sufficient worms to satisfy it; so he substituted a centipede, on touching which, however, with its snout, the mole threw up its head, and, with a stroke of the fore-paw, sent the centipede several inches away. The first batch of worms Mr. Wood gave it consisted of 6 good-sized ones, and one three times as long as the mole itself: after that he gave it more, and so voraciously did it eat that, inclusive of the time occupied in digging up the worms, it eat 14 in 13 minutes. In the evening Mr. Wood resumed the spade, and having heard a popular report that twelve hours' fast will kill a mole, he gave it, before retiring for the night, the large supply of two dozen worms, intending to feed it again about six o'clock the next morning. As it poured with rain, however, at that time, Mr. Wood delayed feeding it till nine o'clock; twelve hours had just passed since he gave it its supper, which must have taken it quite an hour to eat, as it had to hunt for worms about the box; but it had been dead some time, as it was already stiff.

Another instance recorded in the *Zoologist* proves its excessive ferocity. "A very large frog was put into an area with a mole, and the following scene then took place. The mole rushed at the frog, seized it by the hind-leg, and tore at the muscles of the thigh with the greatest fury. The poor frog screamed piteously, and made several frantic leaps, dragging the mole along with it, as the latter retained his gripe with all the pertinacity of a bull-dog. At last his hold gave way, and the frog continued to leap about bleeding profusely, while the mole seemed to be quite mad, turning rapidly round and round, sniffing at the blood stains on the gravel. On the frog being put out of his misery, the mole literally danced round his victim, worrying and biting at the skin of the belly until he tore it open, when he feasted sumptuously on the entrails."

The fur of the Mole, unlike that of other animals, lies flat in whichever direction it is rubbed, and is used for various purposes: mole catchers usually make purses of the skins, and I have heard of a gentleman having a great coat made of them; they are also much used for making caps, tobacco pouches, &c.

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In this way Moles certainly are useful, but I think it is doubtful whether they are beneficial to land, as they throw up the grass or young corn, the latter of which they use as a lining for their nests—as many as 402 blades of young wheat have been counted in one nest, and all apparently so fresh that they must have been collected in the course of two or three days; and although some assert that they, like worms, help to drain land, particularly pasture land, others, allowing this, say that they remove the earth from the roots of the grass, causing a hollow underneath it, so that it dries up and withers. It is generally supposed (whether with any foundation or not I cannot say), that sheep always prosper best where there are many moles.

They are frequently caught alive, as when the ground is very hard their runs are so near the surface of the earth that it is easy to see where they are and to catch them.

The lodges are formed in the following manner. The mole selects a hillock of considerable size, and in this it constructs its nest. The earth forming this mound is well compacted together, and within it are many galleries and passages of communication, the arrangement of which is as follows. Two circular galleries are made, one at the top and one at the bottom connected by five galleries, at equal distances. In the centre is the mole's dormitory, which is connected with the upper gallery by three perpendicular tunnels.

The nest may easily be distinguished from the other mole hills as it is larger and higher. In order to form this the female throws up the earth and thus forms a large apartment, which is supported by partitions. All round the roof she beats firm the earth in order to keep out the rain and damp. She then procures a quantity of grass and dry leaves, as a bed for her young. Next she secures herself by forming passages leading from the nest in all directions, so that as soon as she perceives that her habitation is attacked, she and her young make good their escape through these burrows. Moles' runs are generally found in the neighbourhood of water, as it is necessary for their existence, and consequently after inundations moles are frequently seen swimming about endeavouring to escape; if it were not for these inundations they would multiply so fast as to do great damage to the farmer.

Among moles the male animal is most plentiful, and in consequence many fierce duels are fought before they can obtain a mate. One day, as a gentleman was walking in a copse, he heard a loud rustling, and saw two dark forms tumbling over each other, and evidently engaged in fierce combat; presently one retreated, quickly followed by the other. The gentleman, who had determined to try and catch one or both as soon as he discovered they were moles, jumped through the underwood, and accidentally stopped the fight, when both animals began to sink rapidly into the earth, but still not so rapidly but that one was secured by the skin of its back: the other made its

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escape. The captive was taken home, and put into a large tub, with some earth in it, and covered over with a board, in which he seemed quite at home, and enjoyed himself amazingly with a diet of worms. In this state he lived for three days, at the end of which time, the board being knocked off, he fell an easy prey to a cat, who killed but refused to eat him. The mole seems to be a very fierce animal, and if it were larger might be almost dangerous. One, on being caught, took hold of its captor's fingers between its teeth, and bit so hard that he was at last reduced to the unpleasant necessity of paying it out in its own coin, and bit it almost to death before it let go its hold. The colour of the mole is usually of a blackish grey, but there are great varieties, many of which may be seen in the British Museum. A cream-coloured one was taken in Wiltshire by a mole-catcher, and another of that colour in Richmond Park. The same man who took the latter caught a grey mole with an orange breast, and also one entirely orange, except the head, but it was too much decayed to be preserved.

There were 36 persons present.

MEETING HELD NOVEMBER 2ND.

Geology.

W. D. SMITH exhibited some fossils from the Mountain Limestone.

Ornithology.

G. H. DAWSON exhibited a specimen of the Grey Phalarope *(Phalaropus lobatus)*, shot at East Kennett, on Sept. 26th, by Mr. J. Coleman, and by him presented to the College collection; and also a specimen of the Sparrow-hawk *(Falco nisus)*.

Entomology.

F. J. H. JENKINSON gave a Report.

THE PRESIDENT exhibited a specimen of the Feathered Thorn *(H. Pennaria)*, captured by the Rev. H. Bell.

A. P. HOCKIN exhibited a specimen of the Sawyer Beetle.

Archæology.

H. M. HILTON exhibited some Saxon beads, found in Kent, and also several coins, and read an account of the graves in which they were found.

W. D. SMITH also exhibited a box of coins.

A. ARMSTRONG, Esq., exhibited a half-groat of the time of Henry V.

THE PRESIDENT exhibited a stone Celt, found near the College, and presented to the Society by J. B. Dixon, Esq., jun., of Pewsey.

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Botany.

THE PRESIDENT exhibited a specimen of the Corn Marigold *(C. Segetum)*, a plant new to the College list, which had been found by E. im Thurn; and mentioned an instance of wheat germinating in an ice-house.

E. IM THURN exhibited several species of Fungi, hitherto unobserved in this neighbourhood.

THE PRESIDENT then read the following paper, which he illustrated by numerous experiments, on

LIME.

The substance known by the name of *Lime* is composed of the metal *Calcium* and *Oxygen*. Calcium was first discovered by Sir Humphry Davy, but not being used specially in the arts, no trouble has been taken for obtaining it by a cheaper manner than by means of electricity: hence it is very scarce, a specimen, the size of a threepenny-piece, costing as much as £2 5s. It is of a light yellow colour, something resembling that of an amalgam of gold and silver. It resembles gold in being very ductile and malleable, capable of being drawn out into the finest wire, and beaten out into sheets as thin as the finest writing paper. In weight it is about 13 times lighter than gold. As it unites very readily with oxygen (keeping its lustre in dry air only for a few days), it is never found in nature except in combination with other bodies. In combination with oxygen it forms *lime*, but even this can only be obtained from other compounds, though it is, perhaps, the most widely diffused substance in nature. I cannot venture to enter upon a full description of its different combinations, but shall select some of the more important, and say a few words on each.

Lime itself is very easily obtained by the common process of lime-burning —any kind of lime-stone or chalk, free from impurities, after being submitted to a full red heat for some time (70 hours), will lose its carbonic acid and be converted into lime. In this state it is called *quick-lime*. It is brittle and white, and "being extremely infusible, is the substance selected for ignition with the intense heat of the oxyhydrogen blow-pipe, to obtain the beautiful white light called the "Lime-light." The oxy-calcium light is produced by passing a stream of oxygen through the flame of a spirit lamp so as to strike against a cylinder of lime. A very brilliant light is thus produced, though not equal to that produced by oxygen and hydrogen.

Quick-lime is much used for improving lands, for clarifying the juice of the sugar-cane and beet-root, for purifying coal gas, for clearing hides of their hair in tanneries, and for various other purposes.

Lime has a great affinity for water, and consequently must be kept in a dry place, otherwise it will absorb the moisture and fall into powder.

When water is added to Lime it unites chemically with it, and forms hydrate of lime. This process is called "slacking," and is accompanied with

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the evolution of considerable heat. Slacked lime is used principally for making mortar. Bricklayers have several kinds, more or less suitable for the purpose. The *rich limes* are so called on account of the large increase of volume they assume when water is added to them. In fact by absorbing about 1¼ times their bulk of water, they expand to more than four times their original size, and of course such limes are preferred by bricklayers. But mortar made from these limes is very soluble in water, and hence is not suitable for *outside* work or work under water. For such work *hydraulic limes* are required. These limes have sometimes as much as one-third of their bulk composed of silicate of alumina. Hydraulic limes of the best quality do not swell so much or give out so much heat in slacking, but are nearly equal to cement for the purposes of brickwork.

Lime water is merely a solution of hydrate of lime: it is very useful in medicine. The most interesting fact connected with it, is that when cold it holds more lime in solution than when hot. This is still more the case when the lime is united with carbonic acid, and consequently water charged with this carbonate of lime (as is the case with water from chalky districts), deposits large quantities of it in the vessels in which it is boiled, and produces what is called *fur* in kettles, &c.

Lime has a great affinity for carbonic acid. If lime water be allowed to stand exposed to the air, the carbonic acid in the air unites with the lime and forms a thin coating over it composed of the substance called carbonate of lime. If carbonic acid is forced into it in any way (as by blowing down a tube one end of which is immersed in the lime water), a white precipitate of carbonate of lime is immediately formed.

This leads me to speak of the most important compound of Lime—viz., *Carbonate of Lime*. In this form it is most abundant in nature. Among the varieties of Carbonate of Lime may be mentioned the following:—

Limestone—the name given to all massive varieties occurring in beds. In this form it is most abundant. Considering only England, it is found in different layers of great extent in the Silurian Strata, extending over Cumberland and Westmoreland, the northern part of Lancashire, and the eastern part of Wales. Another variety, the *Devonian Limestone*, occurs extensively in Devonshire. The *Carboniferous*, or *Mountain Limestone*, is found almost uninterruptedly over Derbyshire, the southern part of Lancashire, the western part of Yorkshire, Durham, and Northumberland, (the whole of the Pennine Chain and nearly all the Cheviot Hills being composed of this alone). And the *Magnesian Limestone*, or Dolomite, not occurring in very extensive beds in England, though it does so elsewhere. Limestone, occurring in such large quantities, is of considerable use, especially for building purposes. The most durable is the Magnesian limestone, or Dolomite, of which the new Houses of Parliament are built. It is curious, however, that it is not always of the same durability. The stone for the new Houses of Parliament was unfor-

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tunately procured from a poor vein, and consequently is already becoming affected by the weather. The Cathedrals of Milan and York Minster are both made of Dolomite, which being of a good quality, has stood the test of the weather very well.

Near Sunderland is a very interesting variety of Magnesian Limestone, unfortunately in very limited quantity, occurring in thin bands, and perfectly flexible, hence called *Flexible Sandstone.*

The next important variety of Carbonate of Lime is *Oolite*, so called from its resemblance to the spawn of fish. It consists of small round grains, and occurs in large quantities in England forming a strip of variable width (sometimes as much as 60 miles broad), extending from the northern part of Yorkshire to the south of Dorsetshire, where it terminates in what is known as the Isle of Portland. "Portland Stone," a variety of Oolite, is too well known as a valuable building stone to require further comment.

The last important variety of Carbonate of Lime occurring extensively in England is *Chalk*, forming the whole of the remaining portion of England as far as the German Ocean, upon which, however, in the eastern part, lie the tertiary Strata, and between the North and South Downs the Wealden formation. When we consider the large area covered by chalk, and also the fact that the layer of chalk, is sometimes 500 or even 1000 feet in thickness, we shall have a fair idea of its great abundance in England.

A still greater interest attaches to this variety of Carbonate of Lime from its being the product of organic remains. It consists of minute fragment of coral reefs and shells, and of enormous quantities of infusoria and other microscopic organisms. As we are situated on the great central plateau from which the various chalk ranges radiate, it will be unnecessary to say anything as to its appearance. The characteristic of a chalk country is a series of undulating hills; certain plants are peculiar to a chalk district, but chalk itself is not favourable to the growth of trees—hence the generally bleak appearance of our Downs.

Chalk is extensively used in lime-burning, and as a manure for some soils.

The last extensive formation of Carbonate of Lime is *Marble*, of which many varieties may be enumerated. Its great characteristic, however, is its crystalline structure. It is composed of a mass of minute crystals, and is capable of taking a fine polish. Marble is not found in any great quantity in England, though some varieties are found here. The English varieties are frequently beautifully variegated with fossil shells, &c., giving them a very handsome appearance. Some foreign varieties are of great beauty and rarity —one, the Giallo Antico being now especially so, as the quarry from which it was obtained was filled up, and has not been re-discovered.

Stalactites and *Stalagmites*—caused by water charged with Carbonate of

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Lime in solution. The former is the name given to the long pendants from the tops of caverns: the latter to the masses of Carbonate of Lime which cover the floors. They are frequently of different colours arranged in bands—the so-called "*Gibraltar Rock*" is Stalagmite from a cavern in the Rock of Gibraltar.

Some streams are so charged with Carbonate of Lime that they deposit it on any objects which may be placed in them. In this way "Petrifactions" are formed. By merely suspending articles in the water, or where it can drop upon them, a coating of Carbonate of Lime is formed over them. If the article be perishable (as a straw), it decays after a time, but a perfect cast is obtained by means of the Carbonate of lime deposit.

Wood is also often petrified by Carbonate of Lime, and occasionally whole trunks are changed into stone. The specimens show well the grain of the wood, and some are very handsome when polished.

Satin Spar is a fibrous variety, capable of receiving a fine polish.

Iceland Spar, so called from having been first brought from Iceland. Of this there are innumerable varieties of crystals, some of them of great beauty, the most important of them being a very transparent variety, never found in perfect crystals, and called *par excellence* Iceland Spar. This mineral is of great use in optics. It splits very easily, but always in the form of rhombs, and has the remarkable property of being double refracting (whence the name of Double Refracting Spar is sometimes given to it). By this property, an object placed on one side of it in certain positions is seen double, and by twisting the spar round, these two "images" as they are called, gradually overlap till at length they unite. On further twisting it round they separate, reaching their greatest distance from one another when turned round a quarter of a circle from the position in which the images were seen together.

Such are but a *very* few of the varieties of Carbonate of Lime. A question may therefore arise to some of you, how am I to know Carbonate of Lime when I see it? In the first instance, all the varieties are scratched easily with a knife; then they effervesce strongly in acids; and, thirdly, are perfectly infusible before the blowpipe.

Another species, identical in composition with Iceland spar, but of a different kind of crystallization, is *Arragonite*, so called from being very abundant at Arragon, in Spain. The crystals of this species are very interesting, many of them being compounded of two or three flat crystals crossing one another so as to form a star. A form of Arragonite in an uncrystallized state is called *flos ferri*, or flower of iron, looking like a tangled white cord.

Finally, carbonate of lime occurs in the shells of birds' eggs, and the so-called shells of crabs and lobsters; also in the shells of oysters, and other "shell-fish."

Carbonate of lime is used in making glass, and in the reduction of iron.

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The next important compound of Lime is *Sulphate of Lime*, composed of Sulphuric acid and Lime.

The most important variety of this compound is Sulphate of Lime with two equivalents of water, forming the mineral called *Gypsum*. In a very pure state it is called *Selenite*, a substance very useful in optics. Gypsum is very easily separated into extremely thin layers. When light has been "polarized" (*i.e.*, when half of it has been taken away), and is then transmitted through a sheet of Selenite, various colours are produced, according to the thickness of the sheet. Hence if a series of plates of Selenite of different thicknesses be procured, remarkably pretty patterns can be made for exhibition under the polariscope.

If the water be driven away from Gypsum by means of heat, a hard substance remains, easily reducible to powder. This powder, when mixed up with water, becomes, in drying, hard and compact, and is therefore useful for taking casts, making models, giving a *hard finish* to walls, &c., and is generally known by the name of *Plaster of Paris*.

Alabaster, another variety of Gypsum, is useful for making vases, ornaments, statues, &c., being beautifully white and translucent, and of a fine texture. It is also very soft, so as to be cut with common cutting instruments.

Gypsum, when ground up, is used as a manure, or rather *corrective* of soils.

Both Carbonate and Sulphate of Lime are almost insoluble. Were it not for this insolubility of Lime, we should witness great changes in the earth's surface. Instead of having fine limestone rocks, they would be reduced to a mud by the rains, and thus the whole face of nature would be changed. But though Carbonate of lime is thus almost insoluble, yet when water, charged with carbonic acid, comes in contact with it, a certain portion is dissolved, and hence we get what is called "hard water," so characteristic of chalk countries. This water, as before observed, is very liable to leave a deposit inside the kettle in which it is boiled.*

Another important compound of Lime is that of Phosphoric acid and Lime, called *Phosphate of Lime*. It is this which gives firmness to our bones. Bone itself is made up of the hard substance Phosphate of Lime and gristle, the latter giving it toughness and elasticity, so as to preserve it from being easily fractured.

The late Professor Henslow was the first to direct attention to numerous nodules found in the Green sand formation. These, on analysis, were found to consist of Phosphate of Lime, and passed under the name of *Coprolites*. These nodules, when ground, are mixed with sulphuric acid. The acid unites with part

* The deep holes, so frequent in this neighbourhood, called *Pot-holes*, are caused by water charged with Carbonic Acid coming in contact with the chalk, dissolving it, and then running off through crevices or fissures.

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of the Lime, forming sulphate of Lime (Plaster of Paris), and leaves a substance with an extra supply of Phosphorus, called Super-phosphate of Lime. This latter is a most excellent manure—the Plaster of Paris is not, and hence it can, if necessary, be extracted; but the good qualities of the Super-phosphate of Lime are so great that they more than counteract the bad effects of the Plaster of Paris, and so no trouble is taken to separate the two. The preparation of "Coprolites" is very important in Cambridgeshire and the adjoining counties.

Chlorine and Calcium, or Chloride of Lime, called formerly Muriate of Lime, is also an important compound. Having a great affinity for water it is used for drying gases. When heated and taken to a dark place, it shines like Phosphorus, and is hence called Homberg's phosphorus. Crystals of this substance, when mixed with snow, produce intense cold.

I shall only mention two other compounds—*Fluorine and Calcium*, forming *Fluor Spar*, and *Oxalic Acid and Lime*, forming *Oxalate of Lime*.

The former is found abundantly in Derbyshire, and is frequently called *Derbyshire Spar*. It occurs frequently in cubical crystals of various colours. When heated on a hot iron plate it emits a bright light of various colours. When pulverised, and mixed with sulphuric acid, a gas is given off, which corrodes glass. Advantage is taken of this in etching on glass. The glass is coated with a thin layer of grease, on which is scratched the subject to be etched on the glass. It is then submitted to the action of this gas, which corrodes the parts of the glass not covered with grease.

Fluoride of Calcium is found in the enamel of the teeth, in bones, and some other parts of animals, and also in certain parts of many plants; and by vegetable or animal decomposition it is afforded to the soil, to rocks, and to coal beds, in which it has been detected.

Fluor Spar is used extensively for making ornaments—it is however very brittle, and requires much care in working. It is also used as a flux to aid in reducing copper and other ores, hence the name *fluor*.

Oxalate of Lime occurs in many plants, and is the substance of which calculi, chalk-stones, &c., in the human body are composed.

Should a person foolishly attempt to poison himself with oxalic acid, some of the lime scraped from the wall and swallowed will form an insoluble substance with the acid, and thus his life will be preserved.

There were 55 persons present.

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S. B. Dixon, Esq., Jun., at a meeting of the Geological Section, read the following paper on

THE DRIFT NEAR MARLBOROUGH.

I purpose, in this paper, to explain some of the Drift Deposits that are found near Marlborough, and the probable causes of their formation. The deposits to which I shall refer are—firstly, those which rest on the chalk and cover nearly the whole country round Marlborough; and, secondly, the detached patches of gravel and silt in the vallies. There are frequent examples of the first of these between Granham Hill and Martinsell Hill, where the country is covered with a mass of unstratified matter, partly clay mixed with rough unrolled flints, partly clay alone, and in some cases, though more rarely, a fine siliceous sand, the whole lying in an irregular manner on the chalk. In the sides of the cutting of the Marlborough Railway, close to Granham Farm, the chalk appears to come up in a succession of jagged peaks, the hollows between these peaks being filled up with these clay and flinty deposits. Blocks of a hard siliceous stone, called Sarsen Stone, are occasionally mixed with the clay. These deposits belong to one of the earliest forms of drift. The second is the more usual form, and is commonly found in vallies through which continuous streams are running, or have formerly run, or where periodical or accidental inundations take place. If the course of a stream is observed, it will be seen to be constantly encroaching gradually on the side where there is the deepest water, and deserting the opposite side, where the stream is becoming shallower, this latter side being destined eventually to be left dry. Where the stream flows strongest, a mass of coarse gravel is carried along with it, while in the quieter water sand and mud are being continually deposited at the bottom. When the stream overflows its banks, as during floods or inundations, it will be seen that when the parts which have been inundated have become dry, there is always left on them a thin film of sand and mud. When the stream has altered its course by wearing away the banks on the side where the water is deeper, the opposite bank will for a certain distance be left dry, and on this there will be a quantity of the silt and gravel that has been brought down by the stream. This latter would be a drift gravel deposit, and if a deposit had been formed by continuous inundations, or in a sort of bay, with still and quiet waters, there would be a drift clay deposit, usually called "loess." These gravel and clay deposits belong to a series called the "Post Pliocene," and they have been principally formed since the country has, to a great extent, attained its present configuration. In these deposits are frequently found the bones of elephant, rhinoceros, and many other animals, whose habitation in this country is only known from their remains being discovered embedded in the earth. Bones and teeth of horse and ox are also common. There is another and equally important agency in the formation of

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drift, which is the "glacial" or "ice" agency. Deposits of this formation are called "Boulder Clay," or "Northern Drift," and have been produced by glaciers, which have ground and worn away in their course a mass of substance from the rocks they have passed over, and on coming to a higher temperature have melted, and deposited this substance. As, however, I am strongly of opinion, that there is not any trace of the Boulder Clay in this neighbourhood, I shall not enter into further explanations of it.

I shall now proceed to explain the Drift I first mentioned, and the probable causes of its formation. As I mentioned before, the greater portion of the high country between Granham Hill and Martinsell Hill is covered with a mass of unstratified matter composed of a dark red clay largely mixed with rough angular flints. This deposit is called by the geological surveyors "clay-with-flints," and I shall use that name throughout this paper. Above this is a mass of the same sort of clay, but without flints. This is called "brick-earth." Not uncommonly in this brick-earth there are large blocks of sarsen stone, sometimes lying at the bottom of the brick earth, and resting on the clay-with-flints, and in other places mixed with the brick-earth. Where, however, in this high level country there is a valley, there is a total absence of the clay-with-flints and the brick-earth.

In the railway cutting by Granham Farm the chalk presents the appearance of a mass of irregular peaks. This appearance has been produced by a succession of holes called "sandpipes," or "pot-holes," which have been worked in the chalk, and then filled up with the clay-with-flints and brick-earth.

To account for these deposits and the peculiar appearance of the underlying chalk, I think that the whole of this chalk district must have been originally covered with a stratified deposit belonging to the Eocene formation, (which, I need hardly say, is the lowest division of the Tertiary), probably a very early one, and containing clay, sand, and sarsen stones: this deposit must have been subjected to a submergence, which altered the whole form of it, and a considerable portion was denuded. When this submergence had ceased, an amorphous mass of unstratified matter, composed of clay and sand, with the blocks of sarsen stone, was left, overlying the whole of the district. From the decay of the vegetable matter mixed with this mass (as vegetation always seems to flourish in Tertiary strata) a quantity of carbonic acid would be generated, and the surface water would become charged with this carbonic acid. The water sinking downwards would work on and gradually dissolve holes in the underlying chalk. The carbonic acid and the dissolved chalk, forming a carbonate of lime, would freely percolate the surrounding walls of chalk and escape through them, and through the bottom of the holes that had been formed, and in the course of time large masses of dissolved calcareous rock would be carried away. As a hole is being formed in the manner above men-

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tioned, it is filled up with the superincumbent clay, and the chalk flints, from which the chalk has been washed away, would sink at the same time and mix with the clay. These together would form the substance called clay-with-flints, which, as a rule, fills the lower part of the sandpipes or pot-holes, the remainder being filled with the brick-earth. The clay-with-flints would always be below the brick-earth, though sometimes the whole is absorbed into the clay-with-flints. There is occasionally a thin coating of dark coloured clay round the sides of the sandpipes, which has probably been left from the decay of the chalk. Sand has also frequently worked into the sandpipes with the clay.

At the time these sandpipes were in formation the surface water had begun in some places to wash away the clay and sand, and thus make for itself channels. These would be largely increased by subsequent rains, and eventually the vallies so commonly seen in all down country would be formed. Where the sarsen stones have been mixed with the clay and sand, they have sunk to the bottom of these vallies, and now present the picturesque appearance that is seen in the vallies of stones in this neighbourhood. In these vallies the clay with flints and the brick earth are absent, and the sandpipes have not been formed in the chalk, as the agencies for producing them would have been washed away by the water in its course. I do not think that any further geological change has since taken place in the high level parts of the district, beyond the ordinary atmospheric changes that are continually going on. No fossils or mammalian remains have been discovered in these deposits, except flint casts of fossils, that have been washed out of the chalk.

Following on the above-mentioned changes there comes the formation of the Vale of Pewsey. I do not intend in this paper to go into the causes of the formation of this valley, but I would refer you to a most excellent paper on "The Geology of the Berks and Hants Extension and the Marlborough Railways," written for the Wilts Archæological Society by Thomas Codrington, Esq., F.G.S., where the formation of the valley is most ably discussed, and the altered Tertiary deposits more clearly explained. I would however mention, that I believe the valley to have been formed by the action of the sea, and that the direction of this action was from the south-west to the north-east, not down the valley, as you would be led to suppose from the first sight of it. That the formation of the valley was subsequent to the deposit of clay-with-flints and brick earth is, I think, most satisfactorily determined by the appearance of the chalk escarpment on the right hand side of the road going down Oare Hill. On the top of this escarpment there are sandpipes filled up as those I have described, but on the southern side a considerable portion of the substance with which they are filled has been washed off, and the lower they are in the slope, the greater has been the denudation. After the Pewsey Vale had been eroded by the action of the sea, and after the sea had left it, the general height of the bed of the valley must have been from 90 to 100 feet, at least,

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above the present level of the streams now flowing through it, and the course of the streams round Pewsey took a contrary direction to that of the sea, when the valley was eroded—the streams all flowing from east to west. The earliest deposit that appears to have been left by the streams, is the flint gravel, on Pewsey Common (about mid-way between Oare and Pewsey). This deposit is one of the Post-Pliocene series. It rests on the greensand, and is a mass of chalk flint mixed, though not to a large extent, with a red ferruginous clay and greensand. The flints appear to have had but little, if any, rolling, and evidently were not brought from any great distance. There are occasionally pieces of sarsen stone embedded with them. Although a considerable quantity of this gravel has been dug for road material, I have never heard of any mammalian remains having been discovered in it. Probably if any had ever been there, they would by this time have been destroyed, as the substance would not be a good one for their preservation. Sponges and fossils washed out of the greensand are, however, not uncommon.

The next drift deposit that is found in this neighbourhood is a bed of Post-Pliocene drift close to Pewsey. A good section of this can be seen in the railway cutting near Pewsey Station. This bears a great resemblance to that at Pewsey Common, except that it is much thicker (sometimes, where the underlying greensand has been eroded into gullies, attaining a thickness of 15 feet), and there is a larger quantity of clay with the flints. In some cases there is a fine siliceous sand, which shows signs of stratification. When this deposit was made, the level of the river had been lowered about 35 feet since the Pewsey Common Deposit. During the making of the railway several molars of the *Elephas primigenius*, or Mammoth, were found. They were very much decayed, there being scarcely sufficient substance remaining to hold the enamel plates together. Bones and teeth of the horse (*equus fossilis*), were also found. Of somewhat the same age as this deposit is a quantity of clay at Kepnall (about a quarter of a mile east of Pewsey). There is a large quantity of greensand mixed with this clay. No mammalian remains have ever to my knowledge been found in it, although it has been dug for many years for making bricks. In some places it is seven or eight feet thick, though more commonly from two to three feet. From the time of the deposit at Pewsey Station to the present time the stream must have altered its level and become from 50 to 60 feet lower, and during the whole time continually changed its course. Over a large extent of country round Pewsey there is a deposit of river silt composed of small rolled pieces of chalk mixed with sand and flint at different heights above the present level of the stream. This is more particularly on the southern side of Pewsey; occasionally there are beds of white clay of the same date. Remains of mammoth have been found in this deposit, and it is probable that if further excavations were made other mammalian remains would be found.

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The valley through which the Kennet now flows, I should imagine, was originally formed at the time of the drift I have first described, and was one of the vallies that were eroded at that age. The level of it must then have been at least 50 feet higher than it is at present. At a much later period the present river commenced flowing through it. There is a good section of the river silt in a meadow at the back of Wye House, about 50 feet above the bed of the river, showing most conclusively that the river originally flowed at that height. This silt is composed chiefly of chalk, flint, and sand, with broken pieces of very small fluviatile shells. The great interest that has been given to these Post-Pliocene deposits during the last few years has arisen in consequence of the discovery in them of flints, which show the most undoubted signs of human workmanship. These flint implements have been found in large numbers in many of the river vallies, and in deposits, which, though geologically recent, must be of immense antiquity, and it is evident that man must have been inhabiting this country contemporaneous with the elephant and rhinoceros. The implements, though very rude, appear to have had some care paid to them in making, as there is generally much uniformity in their shape. They have been formed by chipping alone, and do not show the least trace of rubbing, like the stone implements of a later date. I imagine they were for both domestic and warlike use, though, I must admit, I have been at a loss to assign the slightest possible use to some I have seen. I have never heard of any of these implements having been found in the drift in this neighbourhood, still I am in hopes that some may yet be found, if every section is carefully examined.

I will now recapitulate the principal parts of this paper to which I am anxious to draw your attention—

Firstly,—That the whole of this district was covered with some of the earlier Eocene strata.

Secondly,—That the whole of this was submerged, and was subjected to great denudation and alteration.

Thirdly,—That after the submergence, an amorphous, unstratified mass, composed of the altered Eocene strata, covered the country, and that, following on this, the sandpipes or pot-holes, and the vallies on the high country, were formed.

Fourthly,—That after this the Pewsey Vale was formed by marine currents acting from west to east.

Fifthly,—That the high level Post-Pliocene deposits of the Pewsey Vale were then made by streams, flowing from east to west, and that these streams subsequently deposited the river silt and clay in the Pewsey Vale.

The Kennet Valley being originally a valley formed at the earlier age, and, at a much later period, becoming the bed of the present river.

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I would also mention that I do not consider there is the smallest trace of "boulder clay" in this neighbourhood. If it had been present, I think we should have found it on the sides of the chalk escarpment, and of course it would be of a date subsequent to the formation of that escarpment. This is the position it occupies on the chalk hills some distance up the Swindon Valley. It is too frequently the case, to attribute to glacial action any phenomena that cannot be easily explained by other causes.

As the immediate subsoil of this College is drift, I think this subject deserves most especial study from all Geologists here, and I would most strongly advise you to examine carefully every section you can find, and at the same time if you see any flints that bear the slightest appearance of chipping, to bring them away and examine them more carefully at your leisure. I have more than once been rewarded when I have done this. A most interesting discovery of flint implements has been made at Salisbury within the last few years, and many have been found in sections that have been made to lay the foundations of buildings.

MEETING HELD NOVEMBER 16TH.

Ornithology.

G. H. DAWSON gave a Report.

Botany.

THE REV. J. J. PULLEINE read an extract from Baker's "Nile," giving an account of the Potato Whisky, alluded to by the President in his paper on the Potato in the preceding half-year.

THE PRESIDENT exhibited a Mexican gourd.

E. IM THURN exhibited several species of Fungi.

Geology.

C. A. HARRISON exhibited some fossils from the Silurian system, viz., *Orthoceras Brightii* and *Graptolites.*

THE PRESIDENT exhibited some quartz crystals, coloured by iron.

Archæology.

H. M. HILTON exhibited a large number of coins, among which were a sixpenny piece of the time of Queen Elizabeth, a coin of the Emperor Constantine, a Spanish Real of the time of Charles IV., and various others.

T. R. DUMERGUE gave a description of Avebury, which he illustrated by a plan; and exhibited a bowl stand from Pompeii.

THE PRESIDENT exhibited two vases, and a small piece of Etruscan pottery, as well as some ornaments of scented clay, modelled by the hand, made by the nuns at Santiago.

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H. M. MOULE, ESQ., mentioned that the Rev. W. Barnes had told him that the word "Savernake" was derived from an old word, "Scovarnoc," meaning "the eared creature" (*i.e.*, the Hare).

H. M. MOULE, ESQ., then read the following paper on

THE HUMAN BRAIN.

If a "little learning" is ever "a dangerous thing," it is more especially dangerous in the study of anatomy. I do not say that a small amount of anatomical knowledge is necessarily an undesirable thing; but only what the line says, that it is *dangerous*. For, first, to dabble in anatomy *may* only serve to stimulate a perfectly useless curiosity; and any one who takes up this pursuit prompted only by vain curiosity seems to me to be something like a housebreaker in the House of Life. And, next, a little ill-digested anatomy *may* do harm by breeding useless fears and anxieties, the ill-instructed person fancying that he has this or that malady, until on consulting a genuine doctor he discovers himself to be as sound in wind and limb as ever he was. Now, let these few words be sufficient to warn frivolous and trifling thoughts off the ground which I am going to occupy to-night. And let me go on to add further, on the other side of the question, that, supposing anatomy to be approached with the earnestness and thoughtfulness which it deserves, there is no branch of knowledge from which we may learn more thoroughly the nature, both of science itself, and of scientific study. No kind of knowledge gives a fairer insight into the endless ramifications of research, and the many sided nature of enquiries in the field of Natural History. For example, in treating of the human brain, one might take at least half-a-dozen points of view. One might speak of its anatomy, or the laws of its structure: of its physiology, or the laws of its functions and operation: of its pathology, or the phenomena which it presents in a state of disease: of its comparative anatomy or its relation to the brain of other animals: of some unusual condition of the brain, such as somnambulism, delirium, and coma.

I need hardly say that my object at present will be merely the humble one of presenting you with a few detached details, such as in my opinion are best calculated to introduce you to the threshold of a subject beyond which I am not qualified to lead you. I propose, that is, very briefly to touch upon the bare outlines of the brain-*anatomy*, with a few notes on its *comparative* dimensions: on the *functions* of the brain: and on one or two of its unusual *conditions*.

What is commonly called the brain is a certain portion of the great cerebro-spinal system of nerves. This great system is roughly divided into three parts—(1) the *cerebrum*, (2) the *cerebellum*, (3) the spinal *column*.

First, to speak of the cerebrum. If the skin of the head were gently reflected, or turned back over the skull—somewhat in the manner that an

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Indian might do with his tomahawk, and if then the bone were gently sawn through, and the lid of the skull (as it were) carefully lifted up, you would see beneath a whitish, shining membrane, freely marked with arteries, like a map with a plentiful system of rivers. This is the *dura mater*, or outer covering of the brain surface. Immediately below it is a second membrane, of much finer texture, so as to be actually transparent. This is called the *pia mater*, and it lies directly over the brain proper (or *cerebrum*) itself, which wonderful organ lies open to examination on its removal. The masses of soft, grey substance, of which it consists, are divided (as the eye can at once detect) into two equal *hemispheres*, right and left; and each of these hemispheres is divided into an anterior, middle, and posterior *lobe*. The word lobe means fold or mass, (akin to "lap"), and is applied to sections of other parts of the body, for instance, of the ear, the heart, the lungs; and also of the leaf, and the cotyledon of the seed, in plants.

Below, and somewhat behind the cerebrum, lies the *cerebellum*, a much smaller portion of the entire brain, but closely resembling the larger part in form and substance. It was in the pineal gland of the cerebellum that a popular theory of the ancient naturalists placed the seat of the soul. The cerebellum rarely exceeds in weight one eighth or ninth part of the weight of the cerebrum. These two portions together, as having their seat within the skull or cranium are called the Encephalon.

The remaining portion of the cerebro-spinal centre of nerves is called the *spinal column*, from its being chiefly enclosed within the hollows of the vertebræ. The extreme upper part of the column is called the *medulla oblongata*, and this part, as included within the skull, is in strictness part of the encephalon. Any injury done, by dislocation or otherwise, to the spinal column, affects health or life in much the same way as an injury done to the brain: it occasions, that is, partial or total paralysis, or death. Its substance is essentially the same as that of the cerebrum, and like it the spinal column is enveloped in protecting membranes.

If the figure of the brain and its adjuncts be thus elaborate and remarkable, we are compelled to still higher admiration when we think, next, of its *functions*. These may be easily and instructively grouped into the functions of *animal* and of *intellectual* life; though we should bear in mind how closely the two great divisions border on each other, and how often their developments are connected so as to render distinction difficult. In our merely animal life we are indebted to the brain for the powers of *motion* and *sensation*. These may in a state of disease become disunited, and a man may lose the power of movement, retaining that of feeling, in whole or in part, or *vice versâ*. We are so much accustomed to the enjoyment of these powers *in full*, that we fail to estimate their extent and their variety. But here they are, quite distinct yet harmonizing admirably, and all centreing in the wonderful organ we are now

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considering. What sensation is to the body, emotion is to the mind; and what motion is to the body, all the active intellectual operations (which, for shortness' sake we will sum up under the wide term of the *will*) are to the mind. We may, that is if we so choose to do, classify our debt to the brain in this method, and I do not know any consideration that suggests higher notions of its complexity and power. A few words may be added about the guesses (for I think scientific men would hardly call them much more than guesses) that have been made upon the connexion between this and that part of the brain, and this and that function of mind or body. The circulation of blood within the brain is said to be most important towards maintaining the *nervous* power of the body; the power to resist shocks and to undertake effort; all that we understand by tone and spirit. The chief intellectual operations probably have their seat within the convolutions of the cerebrum itself: and the cerebellum has been said to be the main point both of *emotion* and *locomotion*. If this is so, one gains some interesting light on the very obvious connexion between some mental impressions and bodily movements; of which the phrases "to quake with terror," "to dance with pain," "to be bowed down with agony," "to jump for joy," are examples.

The human brain is, with some few exceptions, the largest in relation to the size of the body among all the members of the Mammalia. Some of the smaller apes, and some of the *Rodentia*, are said to be exceptions. Some details of comparative weight may interest you. It must be mentioned that the weights in each case are Troy; and that they are calculated on averages taken in hospital observations upon a hundred or more brains in each instance. The average weight of the human brain is found to be about 3lb. 2oz.; the *minimum* of a healthy brain, 2lb. 5oz. But the *maximum* of a horse's brain is seldom more than 1lb. 7oz., although the weight of the body of a full-grown horse is considerably more than twice that of a man's. The brain of an elephant, seventeen years of age, was weighed about thirty years ago, and found to reach 9lbs. That of a whale, 75 feet long, weighed 5lbs., the relation of brain to body in each example being very much less than in the case of the human brain. The brain of man has been found in rare cases to reach a weight as high as 4lb. 8oz.: and this, I think, was the exact measurement of Porson's brain, which was examined after death. Cuvier was found to have a brain of no less than 4lb. 11oz. in weight, but it must be remembered that he died in a state of cerebral disease. The brain of an idiot has been found to weigh little more than 1½lb. Without attempting to touch the controversy on the exact position of the negro in the human family, I may state this much: that recent dissections prove the negro brain to be, as compared with the Caucasian, not inferior in size, not different in colour, and not materially differing in either arrangement or substance.

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Following the line which I have thought most likely to interest you, and perhaps to instruct, so far as new glimpses of thought or old thoughts in a new dress can instruct, I have only now to speak of certain temporary conditions of the brain; of the healthy intermittent repose, called *Sleep*: and of the morbid or artificial states of excitement or collapse, called *Somnambulism*, *Delirium*, and *Coma*. What sleep is, is a deep and difficult physical question, far out of our depth at present; but the details and conditions of sleep are within our notice, though they often escape it. Sleep exacts from us, on the average, a third part of our lives; a man who has lived sixty years has slept away twenty, more or less. The brain is not, however, idle during this long repose from active exertion. During sleep we can *reason*, we can *invent* or compose, and we can follow the suggestions of sensation with remarkable accuracy. We reason.—Condorcet used to say that he could, and did, often carry on during sleep calculations and arguments made during his waking hours. Jeffrey, when in full practice at the bar, declared that after reading through an ill-digested mass of evidence over-night, he found it in the morning arranged and (so to say) crystallized round its proper points of attraction. And even among ourselves, the familiar fact that "repetition" is better learned over night, shows that the brain is sometimes not idle even during sleep. I am speaking now, as every one perceives, of healthy sleep. The phenomena of mental operation during slightly excited or artificial sleep, might occupy a very large space. To this class perhaps should be referred Coleridge's remarkable and beautiful lines composed during sleep *(Kubla Khan)*. But these are not the only specimens of their kind, and it is probable that more than one of us may be able within our own experience to testify to the power of composition during sleep, at any rate to some small extent. The brain is also susceptible of trains of thought arising from the suggestions of sensation during slumber. A man having a blister applied to his feet will fancy that he is climbing a volcano, and treading on the lava of Vesuvius. If a hot application be made to his head, he will believe that he is about to be scalped. I have little doubt that many of such recorded cases might be found, if carefully examined, to belong more strictly to artificial somnambulism, and to be examples of the power which one person's *will* may acquire, by way of direction and suggestion, over the mind of another. For instance, in the case of a sleeper who was induced (while still apparently soundly asleep) to fancy himself carrying on a long talk with the lady of his love, sustaining a quarrel with her, and making it up, it is likely enough that the sleep was not complete, and that the patient, with that half surrender of will and consciousness into another's hands which is seen in mesmerism, was passively following the suggestions of the humorous friends who were playing upon him.

Somnambulism is much too wide a subject to be talked of in detail here. The natural somnambulism is a morbid development of the conditions of sleep.

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The brain is in some respects as completely quiescent as during healthy slumber: in others, it is far more active, for instance in the power of locomotion and of receiving impressions through the senses. The somnambulist condition produced by mesmeric agencies is clearly one which is beset on all sides with probabilities of deception. It forms the subject of many able and careful scientific treatises but I should only be wasting time, were I to attempt to speak now of its symptoms and nature.

Delirium and coma are two unnatural states of the brain which often accompany a dangerous crisis of illness, or the last ebbing efforts of life. Coma is a complete prostration of sensibility and vital power. The action of the heart and lungs becomes extremely weak, and is sometimes scarcely perceptible. The name "coma" is also given to the artificial state of prostration produced by chloroform and other powerful agents. When a patient is chloroformed, a considerable strain is put on the action of the heart, and the pulse is therefore most attentively watched by the administrator. Delirium may be described as a prolonged and aggravated dream, though this description is far from being adequate fully to meet the endless phenomena of this very remarkable condition of brain. Impressions and ideas during delirium pass the brain in too rapid succession for the will to seize, and therefore for the reason to operate upon them. Apparently awake, the patient will often fail to recognise his dearest friends, and is totally incapable of sustained rational conduct, though certain powers of mind are sometimes stimulated to a very surprising extent. This is especially the case with the memory. Cases are on record of a Welshman, absent for thirty years from his native place, and known to have completely lost the power of speaking Welsh, recovering this power suddenly during delirium; of a servant girl uttering many words and phrases in Hebrew, which she had once picked up from a loquacious scholar in whose service she had been; and of a French countess, who, born in Brittany, had learnt the language of the peasantry during childhood, and who, after long losing it in her conscious thoughts, reproduced it during delirium when no one but a Welsh servant (Gaelic) was able, to the surprise of everyone, to explain the strange speech.

I have added these few details, to the very brief and imperfect notes on the brain now laid before you, because I believe that a few words of quiet explanation on matters which cause terror and anxiety to completely uninformed persons, are likely to lessen or remove the shock of such feelings. Never forget, whatever unusual sensations you may have, that thousands of human beings have suffered the same before you, and that science has been beforehand and is still in advance of you, steadily and calmly inquiring, gently and skilfully testing and applying the means of alleviation and cure. Aid science and obey nature, by preserving to the utmost in soundness and health this wonderful organ of complex powers with which our thoughts have

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been occupied. Follow out every natural provision for its exercise, its use, its rest. Avoid like poison all that needlessly irritates or stimulates it. And, whether in or out of health, remember the words of caution with which I started, and do not speculate about yourself nor dabble in physical matters for foolish curiosity's sake. Learn also to admire. "What a piece of work is man! how noble in reason! how infinite in faculty!" *Mirabilia sunt opera tua, et anima mea cognoscit nimis.*

There were fifty-three persons present.

MEETING HELD NOVEMBER 30TH.

Ornithology.

G. H. DAWSON exhibited specimens of the *Coot*, *Ring Ousel*, *Hawfinch*, *Brambling*, and *Golden-crested Wren*.

The PRESIDENT read a letter from A. H. Glennie, asking for information about the song of the Crossbill.

Entomology.

A. MARSHALL noticed the capture by himself of the Winter Moth (*O. Brumata*) on Nov. 28.

The PRESIDENT exhibited two boxes of Brazilian Lepidoptera.

Archæology.

H. ÀCOURT exhibited a box of coins, among which were: a coin, probably a sextans, of Maximian, A.D. 286; a 10-reis of John V. of Portugal, A.D. 1743; a silver penny of one of the Edwards; a Chinese *cash*, value one-twelfth of a penny, composed of six parts of copper and one of lead; &c.

W. D. SMITH exhibited a Portuguese coin of Peter V., value 100 reis, equal to 6d; an Exeter halfpenny token, round the edge of which are the words "Payable at the warehouse of Samuel Kingdon," a shop which still exists; a silver two-penny piece of Henry VIII.

T. R. DUMERGUE exhibited Denarii of Diocletian, Faustina Augusta, Antoninus Pius, and Domitian, and shillings of Elizabeth, Edward VI., and James I., &c.

Botany.

E. IM THURN exhibited a specimen of *Tremella foliacea*, a fungus hitherto unobserved in the neighbourhood; also a collection of Swiss plants.

Zoology.

The PRESIDENT exhibited the skin of a Common Snake, which had measured 3 feet 10 inches in length, when alive.

Geology.

E. IM THURN exhibited a Madrepore, picked up near the Great Orme's Head.

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C. A. HARRISON read the following paper on

THE STRATIFICATION OF ROCKS.

I purpose this evening to speak on the Stratification of Rocks. I shall first speak generally of the different modes by which rocks are formed, and then show how these different formations appear in England.

There have been two great agencies in making the crust of the earth, namely, water and fire, and the rocks formed by their means are respectively called Aqueous and Igneous Rocks.

Aqueous, or as they are also called Fossiliferous Rocks, because they alone have fossils, are more widely spread over the earth than any other. Now the question is, how were they formed? Everyone knows how the rain after falling forms brooks, the brooks become rivers, and how very rarely rivers are clear. Now this muddiness arises from the fact that every river holds in suspension a great deal of sediment which has been derived from the waste of the land through which it passes. When this sediment is carried out to sea, it is deposited at the bottom, and by gradual accumulation forms what geologists call *strata*. This is the general form of stratification. The Nile is a most interesting instance of this: that river overflows once a year, and the thin layer of mud deposited differs slightly in colour from that of a previous year, and by different measurements it has been calculated that the average deposit in a century is about five inches. Pits have been dug in the Delta of the Nile, to the depth of 60 feet, without going through any other material than Nile mud, so we may say that the Nile Delta is some 150 centuries old at least; if we suppose the same agencies to have always acted as they do now. This statement may prepare you for the vast periods Geology requires for the formation of different beds.

You must remember, too, that while rivers are forming beds by their deposits of mud, &c., they are taking all this mud and stuff from something else: and so whenever we see a huge mass of mechanically formed aqueous rock we must feel sure that a gap has been made somewhere on the earth equal to the contents of the rock. I have mentioned rivers as one of these removing, or, as Geologists call it, denuding causes. Another, and the greatest, is the sea. Anyone who has lived long in the same place on the sea coast, will have noticed how very much the cliffs are worn away every year by the action of the sea, and indeed made to have quite different forms, and how every year the sea steals more land. Geologists say that the only agent to which the destruction and removal of masses of rock, notwithstanding their being many thousand feet thick, and hundred thousand square miles broad is owing, is the slow, gradual gnawing of the sea breakers upon coasts.

By this gradual gnawing of the sea and rivers the great vallies are formed, and consequently mountains, which are formed by the material taken away from the valley; but you can generally tell what has been denuded by sea and what by

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river. The sea, acting with a broader wide-spread action, rounds off the tops of hills, &c., like our downs, while the river cuts through a comparatively narrow line of ground, and tends to make the surface uneven, and to wear it into deep, rugged valleys. One more aqueous agency there is of great importance, and that is *glaciers*. Whenever a glacier passes over any solid rocks, the rocks in that valley become smoothed and polished, and present a wavy surface; and this comes to pass in this way: every glacier is traversed by cracks called "crevasses." Now the mountain peaks above the glacier are sometimes so steep that snow will not lie on them, and consequently they become crumbly through the influence of the air, &c., and tumble down on to the glaciers: these masses are called moraine stones, and generally make a line down the middle and along each side of the glacier. By degrees some of these large stones fall into the crevasses, and so are kept tight between the ice of the glacier and the rocks over which the glacier is moving, and so the result is that however hard the rock is these glaciers smooth them like glass, and not only does the rock get polished, but the moraine stones as well. The markings made by the slow scraping of these stones are quite different from those made by water or by torrents, as the stones, fixed firmly in the ice, and pushed along by it under great pressure, scoop out long rectilinear furrows or grooves parallel to each other. With glaciers may be classed icebergs. Suppose the sea to freeze at the base of some cliff; fragments fall on to the ice, the tide washes over these fragments, the water becomes frozen, and the blocks of stone are in this way locked up in the ice. The ice, when Spring comes, breaks up, and huge icebergs with these stones in them go floating about; these are carried into warmer latitudes, or the Gulf Stream, and there melt gradually away, and so unloose the stones in them, which of course sink to the bottom; or else they are driven on to the shore, where they leave their passengers. It is only in these ways (viz., glaciers and icebergs) that geologists can explain the existence of large boulders in places where they have no right to be when the material around is examined, and it is probable, though it is still a matter of doubt, that the stones in the Valley of Stones on the Bath Road, or in the glen of the Devil's Den, came there in this manner.

I shall now turn to the Igneous Rocks. Respecting igneous rocks, there is no satisfactory theory, some geologists ascribing all igneous phenomena to some *great central source of heat* in the centre of the globe. Others account for their production by chemical unions among the primary constituents of the rocky crust. These two theories are called Mechanical and Chemical. The three principal igneous rocks are *Granite*, *Lava*, and *Trap*; Granite (*granum*, because a compound of distinct grains and crystals) is found at the base of all rock, and is supposed to be lava, which has been hardened under vast pressure. Lava, as you know, is the molten material thrown up by volcanoes, and spreads over other strata, and this is the difference between granite and lava:—Granite is at the base, lava on the surface of rocks. Trap, a word derived from the Swedish

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trappa a stair, so called from the step-like appearance it gives to the hills composed of it, partakes sometimes of the nature of granite, sometimes of lava.

There are, then, two active powers at work even now in forming the crust of the earth—water and fire. Water by the agencies sea, rivers, and ice; fire by volcanoes and gradual upheaval in the subterranean depths of the earth. The Aqueous rocks generally, if not always, contain fossil remains, the Igneous never, because they have been under the influence of fire and all remains have been burnt out.

To apply these remarks to England. England has been called the Paradise of Geologists, and with very good reason, for very few geological formations are absent. The different strata appear in very marked ways:—Taking a line down from about the River Tees to the River Exe, we shall find that to the west of that line all the Primary or Palæozoic rocks appear and the Secondary rocks to the east of it. The Tertiary are generally in basins, of which the chief are the London basin, the Hampshire basin, and the Isle of Wight basin. Again the primary rocks in Wales are higher than the other formations in England, and supposing a journey were taken from Dover to the Menai Straits, it would be found to have a gradual ascent all the way, till the highest point was reached in Snowdon. Of course there are down hills and declivities, but these are generally owing to denudation. Another circumstance worth noting is that all the strata slope the same way from west to east, showing that the sea washed over them in that direction. I intend to go through this list of rocks, stating some of the peculiarities, as well as the animals and shells, and flora peculiar to each, specimens of which I will send round. But first I will show the general features in the large classes. In the Igneous rocks, as I said before there are no organic remains, or remains of any life, whence one of their names—Azoic, (*i.e.*, without life). The 2nd, Palæozoic, old life period, contain few or no fossil plants, or remains of any higher animals than crustacea, shellfish, and zoophytes.—Mesozoic, middle life epoch, contain fossil plants and animals of species totally different from those now existing. Cainozoic, recent life, contain the remains of plants and animals of species not very different in character from those we now have. (*Specimens of the different strata were then passed round for exhibition*).

The Lias is very rich in remains of ancient life, it is in this strata that the reptiles Ichthyosaurus and Plesiosaurus are found, besides great numbers of shells, particularly Ammonites; in fact at Whitby, where the Lias is the formation, the Ammonites are so plentiful that there is a legend that they were once all snakes, which infected Whitby, and annoyed the good citizens, but St. Hilda, the patron saint of the place, after whom the Abbey at Whitby is named, by a miracle prayed off the heads of the snakes and prayed them

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into stones, and what we call Ammonites are according to the legend only petrified headless snakes.*

The Oolite, so called from the great resemblance of the material to the roe of a fish, looking just like a number of very small eggs packed very close together.

Then come the Wealden Beds, which are very interesting, as they are of fresh water formation, and represent the Delta of a huge river, which may have been quite as large as the Ganges or Mississippi, and drained a large continent equal to Asia or North America, of which England formed but a very small portion. In fact you must not think that England was always an island; it has only become so quite recently, geologically speaking, and the way we know that it was once joined to Europe is this :—the same beds occur on either side of the English Channel, for instance, there are chalk cliffs at Calais and at Dover, and in all probability the land has been divided by the sea washing its way through. To return to the Wealden. I said it was a fresh water formation, and the mouth of some huge river, you might naturally ask, how do they know all this? the answer is, partly by the strata, but chiefly by the remains of Crocodilian reptiles, and shells, whose names I need not give, but which you would find any day on the banks of a canal or river. The Weald at length was submerged in the sea, and on it were formed the chalk series to the depth of from one thousand to twelve hundred feet. I will not go into the Tertiaries and post Tertiaries because I am afraid I have given you more than enough hard names to remember, but they are generally gravels, raised beaches, and deposits in Caves and different sorts of Clay. I hope I have now shown you what are the larger formations in England, I will now try to show what part these formations play in making the scenery of the country.

Whenever you see very hilly country and ragged scenery you may generally suppose that there are either igneous rocks or some of the primaries. Take for instance Wales and Scotland, in the former the Silurian, in the latter Gneiss and Granite are the prevailing Strata. Secondly, when you see beautifully rounded hills, as the downs you may generally know that the sea has at some period covered that part of the country, and moulded it into that shape.

I will conclude with a few words on the history of geology. There has been really no established history till 1790, though there have been numerous writers from B.C. 535, the date of Xenophanes, whom we know by the well-known

* This legend is recorded by Scott in Marmion :—

And how the nuns of Whitby told,
How of countless snakes each one
Was changed into a coil of stone,
When holy Hilda prayed.
Themselves within their sacred bound
Their stony folds had often found.

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example "Xenophanes ait lunam habitari," but they have written more on mineralogy than on fossils, and have indulged in theories rather than observation. However, in 1790 a surveyor called William Smith, who had no advantage of wealth, station, or college education, by dint of unwearied observation, arrived at results similar to those obtained by the continental geologists, namely the discovery that the order of the succession of different groups was never inverted, and that they might be identified at very distant localities by their characteristic fossils. He then published his "Tabular View of the Strata," in 1790, and afterwards, unaided, almost unnoticed and unknown, he pursued a series of investigations, which ended in the publication of his Geological Map of England, to which a celebrated continental geologist paid a high and just compliment, saying that what many celebrated mineralogists had only accomplished for a small part of Germany during half a century had been done by a single individual for the whole of England. You see then what any one may do in geology without assistance, and any one of us can by careful observation perhaps add to the science of geology, and I trust the Natural History Society will be able, some day or other, to contribute its share in the work.

There were forty-four persons present.

MEETING HELD DECEMBER 15TH.

In consequence of the Examination, there were no reports from the heads of the different Sections, and but few objects exhibited.

A magnificent collection of British Sea-weeds, presented to the Society by Mrs. Gray, of the British Museum, was passed round, and thanks ordered to be given to the Donor.

E. DE THURY exhibited specimens of the Water Rail, Kestrel, and Tern, which latter he presented to the Society.

The following summary of proceedings was then read:—

	1866	Corresponding half 1865
Number of Meetings	7	8
Average No. of Members present	26	23
„ Visitors „	24	21
Total No. of Exhibitions	100	116
Collections exhibited	23	19
Average No. of Exhibitions per Meeting	14·2	14·4

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The Rev. J. J. PULLEINE then read a paper, illustrated by numerous diagrams, specimens, and microscopic objects, on

TREES.*

My subject offers a very large field, one which it would be impossible to traverse in a short paper like the present. I might have spoken of the general distribution of trees throughout the globe, and contrasted the palms and tree-ferns of warmer climates with the forms with which we are acquainted; or the gorgeous crimson and scarlet flowers of the trees of the Island of Ceylon with the insignificant blossoms, unnoticed except by botanical eyes, of the forest-trees of our Island. I might have confined myself to the history of English forests and forest-trees, and made my paper half botanical, and half, so to speak, archæological. It would have been interesting to have spoken of the changes in the uses and value of various trees in England,—of the time, for instance, when oaks were valued more for the acorns which fed the swine† than for the timber which until these days of Warriors and Monitors furnished the wooden walls of our Island; or again, I might have told the history of yews, how once they were carefully cultivated and guarded with all the jealousy of the law, as the producers of the dreaded English long-bow—the conqueror of Cressy, of Poictiers, and of Agincourt—and how afterwards they were doomed in the days of Dutch gardens to be pinched and clipped into every shape under the sun. Many such gardens still exist. At Levens Park, near Kendal, the trees have been made to represent various forms of helmets. The history of the larch, again, now one of the most useful of our timber trees, is very interesting. It was imported as an ornamental tree about 200 years ago, and was considered a rarity, until, about the middle of the last century, the Duke of Athol commenced planting them by thousands on his Scotch estates.

But I must hurry on, only just stopping to remind you that coal measures are the remains of vast forests which thrived and flourished thousands upon thousands of years ago, and that many fossil trees are still found in them which mark for us the vegetation of the pre-historic periods.

We in England are justly proud of our trees, and we can fully appreciate their utility, and partly their beauty and durability: but we can form very imperfect notions of the size to which trees are capable of attaining. Our largest English trees fade into insignificance when contrasted with those of tropical regions, where heat and moisture combine to stimulate to the utmost their growing powers. The Baobab trees of Senegal in Africa are said to have occasionally a girth of 90 feet, and specimens of *Wellingtonia gigantea* have

* I beg to offer my most sincere thanks to the Rev. T. A. Preston for the assistance he has given me in preparing this paper, and especially for the loan of diagrams, and of a very valuable collection of British and foreign woods.

† Selby's "Forest Trees," p. 257.

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reached a height of 400 feet, whilst the famous Banyan, or Indian fig-tree of India covers with its shade an almost inconceivable area. This last species throws out roots from its branches, which in time reach the ground, and act as props to the parent tree. A specimen growing on the banks of the Nerbudda * is believed to be identical with one which in the time of Alexander the Great was said to be capable of sheltering 10,000 men. Some of its many stems have been carried away by floods, so that it can now shelter no more than 700, but its chief trunks—thicker than those of our English trees—still number 350, whilst the smaller stems amount to more than 1,000.

The age of some of our English trees is very great. There are still, or were lately in existence, oaks and chesnuts which were known as old trees in the time of the Conqueror, and at Fountains Abbey there is a solitary yew—the last of seven—which is said to have afforded shelter to the monks of Fountains, when the abbey was building in the 12th century. Balfour mentions a yew at Hedsor, in Buckinghamshire, supposed to be 3,000 years old, but the patriarch of the whole race of trees is the Baobab above mentioned, specimens of which are said to be 5,000 years old.

So much by way of preface. What I propose to do to-night is, to give a short account of the different forms of the stems of trees, and to explain how wood is formed. After this, if time allows, I should like to say a few words on the functions of the different organs of the tree.

But before I speak of stems, it will be necessary to explain of what wood consists. All plants are composed of two kinds of tissue, *cellular* and *vascular*. It is by the union of these tissues that the organs are formed, by which all the functions of plants are carried on. *Cellular tissue* consists of a large number of very minute bladders or cells. These cells, though not visible to the naked eye, assume an immense variety of shapes, all of which have been named by vegetable physiologists. I will try to introduce as few technical terms as possible into my paper to-night, because there are many here to whom this subject is a new one. But it must be borne in mind that in all scientific subjects an accurate nomenclature is of absolute necessity for purposes of classification, and must be thoroughly mastered by any one who is really pursuing natural science for its own sake. The object, I take it, of the papers which are read before this Society (where each member is or ought to be devoting himself to some special line), is that they should, whilst containing something that is interesting to all, give an outline which may be filled in by those who take a special interest in the subject before them—that they should, in fact, be suggestive, rather than exhaustive, and guides to science, rather than scientific in themselves.

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* See Heber's Travels in India, iii. 67. Milton refers to this tree in "Paradise Lost. Bk. ix. 1100 sqq.

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But to return from this digression. I was speaking of the various forms which the bladders of the cellular tissue assume. They are sometimes conical, as in hairs, others are cylindrical, fusiform or spindle-shaped, stellate or star-shaped, and prismatical. These last are especially interesting to us, as it is these when compressed which form the *medullary rays*, of which I shall shortly speak. Sometimes the coating of the cell has the appearance of being pitted, sometimes a spiral fibre is coiled up within. The most familiar instance of cellular tissue which can be named is Cotton.

Vascular tissue is formed of long tubes, of which there are many varieties, but I shall confine myself to speaking of the *woody fibre*. In this the tubes are spindle-shaped. Their coatings become hardened by a succession of deposits or incrustations of matter, and it is of these that the wood of trees is formed. In hemp and flax the woody fibre is very easily distinguished. The markings upon this woody fibre are generally indefinite, but in the case of Coniferæ they are stamped out with exceedingly minute circles, as though by a die. This form of tissue is called punctated. Such then are the elements of which wood consists. I now proceed to the examination of the stems of trees.

There are three forms of stems:—

1. Exogenous or Dicotyledonous.
2. Endogenous or Monocotyledonous.
3. Acrogenous or Acotyledonous.

As all our British trees and all timber trees are Exogenous, I shall devote the chief part of my paper to them. First, however, it will be desirable to point out the chief points of difference in the three kinds of stems.

1. The chief characteristics then of Exogenous stems are as follows:—They increase by forming fresh layers of wood *externally* to the old layers. The bark can easily be separated from the trunk. The annual growth is marked by distinct concentric rings, and they contain in the centre a canal containing pith, which is connected with the bark by thin rays of cellular tissue, called medullary rays. The natural result of this mode of growth is that the wood is most solid at the centre, the solidity diminishing towards the circumference.

2. Monocotyledonous stems have no separable bark—no annual rings, and no distinct pith. Instead of growing more solid towards the centre, they are hardest towards the exterior—the centre being frequently hollow. The name of endogenous was given them from an idea that the newest fibres were nearer to the centre than the old, but it has since been discovered that the fibres cross one another before passing into the leaves. There is no distinction between pith, wood, and bark. Bundles of vascular tissue are scattered throughout the cellular tissue, and accordingly a section of the stem will show neither annular rings nor medullary rays. The most familiar instance of a monocotyledonous stem is the cane. In England the butcher's broom (*Ruscus*

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aculeatus) is the only monocotyledonous plant of any size. Sections of palm wood show the formation well. Monocotyledons are short-lived in comparison with Dicotyledons, the cellular tissue in time ceasing to convey nourishment. The leaves are produced from a central terminal bud.

3. Tree-ferns have Acrogenous stems, *i.e.*, stems which are increased by additions at the summit. The vascular bundles form an irregular circle round the exterior. The bark, if it may be so called, is formed by the bases of the leaves. In a young state the stem is solid, but frequently becomes hollow by the rupture of the walls of the cells in the centre. The stems of tree-ferns sometimes reach the height of 120 feet.

Let us now trace the growth of an exogenous stem. Suppose an acorn or the seed of any other dicotyledonous plant to have fallen in the ordinary course of nature into the ground. The embryo, after remaining in a state of torpor, it may be for one, or two, or many years, at length bursts its sheath, and two small root-leaves, or cotyledons, appear above ground, just as we see them in turnips or radishes. Between them is a small bud or plumule, from which are produced the true leaves. What is the formation of the young stem? If we take a section of one we shall find at first a mass of *pith*, which is formed entirely of cellular tissue: around this a ring of ducts and vessels called the *medullary sheath*, and over this a coat, called the epidermis. By degrees the spindle-shaped woody fibre is produced, and a further development of cellular tissue takes place between the medullary sheath and the epidermis, or outer covering, whence are produced two layers, the vascular tissue forming a layer of wood, the cellular, of bark. This is the state of the young stem at the end of the first year. During the second year a half-fluid matter, called *cambium*, appears between the wood and the bark, which gradually becomes organized, and separates into two layers, of the same kind as before. Thus the first ring of bark is gradually pushed outwards. This process is repeated—a fresh layer of wood and a fresh layer of bark every year. With the growth of the tree, the external layer of bark is strained and cracked, whence its rugged appearance. The woody fibre in the meanwhile continues to increase, wedging itself in, as it were, circumscribing the pith in the centre, and compressing that which surrounds it, until the connection between the pith and the bark consists merely of narrow streaks, which, by continual pressure, become the hardest portion of the wood. These streaks are termed medullary rays. Their principal object seems to be to keep an open passage for the sap, by resisting the pressure of the annual rings. The stem, then, is formed of two distinct tissues, of which the pith, the medullary rays, and the bark are *cellular*, and the remainder *vascular*. We may compare the stem of a tree roughly to a wheel, the wood-work representing the cellular tissue, and the spaces between the spokes the vascular tissue.

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Having now traced the growth of a tree for two years, let us pass over, say half a century, and take a fresh section. We shall find *four* principal divisions—the pith, the heart-wood, the sap-wood, the bark.

The *pith* in general takes up very little space. Originally containing a considerable proportion of water, it nourishes the plant when young, but afterwards withers up, or is entirely absorbed.

In the last three divisions we observe a number of concentric rings, which generally mark the growth of each year, although any sudden stimulus is sufficient to add a ring. By these, as you all know, the age of a tree can be determined, at any rate within a few years. To shew the regularity with which the rings are formed, I have received from a very reliable source an account of some larch trees, planted in 1747 or 1748, and cut down in 1832. "Six," says my informant, "were examined by me, and each of them had 83 rings." And these rings not only give the age of the tree, but likewise its history. In Sherwood Forest some old trees were cut down, inside the wood of several of which were found letters marking the reigns of various kings: thus nine inches inside one tree were found the initials "W. M." for William and Mary, with a crown above them; and 18 inches within another, the letter I, with a crown, for King John. For calculations respecting the age of these trees, a reference may be made to "The Beauties of England and Wales." The history of the climate is also recorded: thus in a moist year a broad ring will be formed; in a dry year, a narrow one. Moreover Decandolle, in examining an old Juniper tree which had been cut down in the Jardin des Plantes, discovered some black spots on various rings. By counting he found that severe frosts had occurred in the years when the marked rings had been formed. The rings are often broader on one side of the tree than the other. Two reasons may be given for this—either the tree has been exposed to some prevailing wind, which has checked its growth, or the roots have been more vigorous on one side than the other. It is very interesting, too, to observe how, where a branch has been cut off, the annual rings, which had before had two centres, will work their way round the lopped branch, and envelope it within its folds. In tropical countries, where vegetation receives no periodical check, like our winter, the annual rings occasionally cannot be distinguished.

How is it that the wood grows hard? There is always a well marked line between the sap-wood and the heart-wood. The sap in its passage through the stem leaves a deposit, which by degrees fills up the channel altogether, and the wood becomes close compact and durable. The durability of some woods, especially of oak timber, is very remarkable. Two specimens of old oak have been lent me, one, a portion of the Rose Blanche, a vessel built by Henry VIII., cut in 1510, and which lay submerged 320 years; the other, a piece of oak from York Minster, which was cut in 1864, which, after five centuries' wear, seems as strong as ever. There is also an account of an

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immense oak beam, which was discovered in good preservation in demolishing some old buildings in Paris, upon which was carved an inscription to the effect that it had been placed there in 1450, and was 600 years old when cut in the Forest of Rovray—a portion of which is now occupied by the Bois de Boulogne.

Timber also varies immensely both in weight and hardness. Take in your hand, for instance, a piece of Quassia Wood (Jamaica), or pencil cedar, or, lighter still, of Cork Wood (Dominica), and a piece of ebony of about the same bulk—the difference is astonishing. The hardest wood, perhaps, is Cam Wood (Africa).

I now come to the question of the circulation of the sap. I can only detail to you the experiments which were made some years ago by Knight. First he removed a portion of bark, about half an inch in breadth from a number of trees. The result was that the stem and branches above the incision, communicating with the leaves through the bark increased as before, but below the incision the growth of the tree was at a standstill. It was plain, therefore, that the *upward* current of sap was not impeded by the incision, but the *downward return* current was. Hence it was concluded that it was the downward current which assisted the tree's growth. Moreover the direction of the current of sap was traced, by means of coloured infusions, running by one series of vessels up to the leaf, whilst another series returned a fluid in most cases colourless, out of the leaf. These tubes entered the bark, and apparently descended to the points of the roots.

The second experiment was the removal of the sap-wood, and then no vegetation whatever took place. Hence it is through the sap-wood that the crude sap ascends.

The entire removal of the bark, however, would soon have a very injurious effect on the tree. The tender wood from exposure to the weather would shrink and prevent the sap from rising, and so the vigour of the tree would be greatly impaired. Thus in some parts of Savernake Forest—there are fine beeches which this year had not a tenth part of their compliment of leaves—the rabbits in the severe weather having gnawed away the bark all round the trunk.

It is then when descending, that the sap forms the new layer of sap-wood. The amount of sap-wood in different trees varies considerably, Thus the yew has about 30 rings of sap-wood. Memel fir 44, and red Canada pine as many as from 80 to 100. In marshy soils the quantity of sap-wood and bark is very large in proportion to the heart-wood.

Having thus given a sketch of the different parts of the stem and their uses—there are two more subjects which must not be omitted, viz.:—The buds and branches, and the roots of trees.

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Buds are formed wherever leaves appear, though occasionally they are found where leaves do not appear, when they are called *adventitious*. They are either terminal, that is produced at the end of the branch, or *lateral*, produced at its side. Many buds, however, prove abortive, or at any rate remain dormant—sometimes for many years. They are carried outwards with the growth of a tree, and are ready to burst forth should any injury arrest the growth of the terminal bud. This is the theory upon which the custom of pollarding trees is founded. In a pollarded tree the sudden growth of twigs is not a collection of branches newly born, but of dormant branches whose vitality has been once more awakened by lopping off the leading branch. These abortive buds occasionally take very curious forms—the balls of twigs which we see in birch trees are produced in the manner above described. Sometimes the abortive buds swell out in large lumps upon the stem, giving it a gouty appearance, as in the * Wen Oak of Savernake Forest, and excrescences are sometimes formed of large size, which detach themselves from the trunk entirely.

The *root* is analogous in structure to the stem, as it descends into the ground, giving off small branches—at the extremities of which the cellular tissues instead of being covered with an epidermis like the rest of the plant, is exposed. The organs which absorb the nutriment of the tree are called spongioles.

The development of roots, however, is not entirely confined to the lower part of the tree. Some Parasitic plants possess only aerial roots—which absorb their food in the state of vapour—and certain tropical trees are in the habit of developing aerial roots which gradually descend to the ground, and become props as in the case of the Banyan Tree. In the case of the Mangrove Tree, which grows at the mouths of muddy tropical rivers, the roots are formed before the seed drops from the tree, and adventitious roots are also formed which give the tree the appearance of walking on stilts. The screw pine, a native of the Indian Islands, also sends out adventitious roots in a regular spiral order. In course of time the original stock and the elder roots decay, and the tree is entirely supported by these adventitious roots.

There is a theory that every bud is a perfect plant on a small scale, with both an ascending and a descending axis. Certainly the production of roots by the screw pine seems in favour of this view. The distinction between the root and the stem is that the former does not produce leaf-buds.

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* It may be worth mentioning the origin of the names of the other two famous oaks in Savernake Forest—the Duke's Vaunt, and the King Oak. The former is said to have been the favourite tree of the Protector Somerset—the latter is said to have been so called after George I.—not, as is generally supposed, after Henry VIII.

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Ash-trees are sometimes found which have grown on pollard willows, and struck through the decaying stem into the ground. These roots become covered with green bark, like the stems of other trees. Moreover, in very aged and hollow trees, especially in yews, we sometimes find a root like a pillar supporting the roof, as it were, of the cave which the tree has formed. There is one at Fountain's Abbey, supporting the last of the aged yews for which the Abbey is famous, and another at the village of (*) Thornton Steward, near Bedale, Yorkshire. They are covered with a coating of bark, and would be at any time taken for *bona fide* stems. This effort of a tree in supplying supporting columns to save itself is very remarkable. The probable origin of the stems is as follows :—† When the top of the trunk has begun to rot from the combined effects of age and weather, a rich mould is formed. Into this a dormant bud suddenly strikes, and the root gradually works its way downwards through the rotting heart of the tree, until it reaches the ground. Meanwhile the decay reaches the bark, and a rift is made in the stem. The rotten timber-wood falls out, and the new root is seen in the form of a stem, firmly established in the ground. It is just possible that the prop may be actually a fresh seedling tree, which has vegetated in the same way as the ash-trees above mentioned. There is also, in "Selby's Forest Trees," an account of a yew-tree, in Worcestershire, growing out of a hollow pollard oak, in which case the seed must have been deposited in the decaying top of the oak, and gradually worked its way downwards to the ground in the manner above described.

The subject, to be fully treated, would require a much longer time than we can be allowed here. One point—the leaves of trees, which serve the same purpose as the lungs of the animal frame—I have purposely omitted, as requiring a more minute consideration than could be given to it in a general paper like this. I hope at some future period to be able to continue the subject, being as it is full of interest, not merely to botanists, but to everyone who cares about nature at all, for whether we look at their beauty, or their enduring strength, or their wide usefulness, in each and every way, we cannot but feel that they are among the greatest of the Creator's gifts to man. Perhaps I may be excused for quoting, in conclusion, those famous lines from the Faerie Queene :—

"And foorth they passe with pleasure forward led,
Joying to heare the birde's sweet harmony,
Which therein shrouded from the tempests dred,
Seemed in their song to scorn the cruell sky.

---

* I have to thank the Rev. A. Fitch, of Thornton Steward, for many valuable suggestions while writing this paper.

† See Selby's Forest Trees, p. 377.

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Much can they praise the trees, so straight and hy,
The sayling pine, the cedar proud and tall,
The vine-propp elme, the poplar, never dry,
The builder oake, sole king of forrests all,
The aspine good for staves, the cypresse funerall.

The laurell, meed of mightie conquerours
And poets sage; the firre that weepeth still,
The willowe, worne of forlorn paramoures,
The eugh, obedient to the bender's will,
The birche for shaftes, the sallow for the mill,
The mirrhe sweet-bleeding in the bitter wound,
The warlike beech, the ash for nothing ill.
The fruitful olive, and the platane round,
The carver holme, the maple seldom inward sound.

There were thirty-four persons present.

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ENTOMOLOGY.

As with Botany, so with Entomology, the wet September put an early termination to our collecting—hence, the list is not so long as could be wished. Several new species have, however, been added to the list, many of them by C. M. Bull, Esq., whose able assistance we hope to receive for the future.

Names of those whose initials occur in the list:—

F. F. B.	F. F. Back.
H. B.	Rev. H. Bell.
R. H. B.	R. H. Brown.
C. M. B.	C. M. Bull, Esq.
W. W. D.	W. W. Dayman.
A. C. H.	A. C. Hilton.
H. M. H.	H. M. Hilton.
F. J. H. J.	F. J. H. Jenkinson.
F. P. M.	F. P. Mansfield.
A. M.	A. Marshall.
J. C. P.	J. C. Palmer.
C. E. P.	C. E. Powell.
J. J. P.	Rev. J. J. Pulleine.
T. T.	T. Tilleard.
E. H. W.	E. H. Wayman.

LEPIDOPTERA.

Gonepteryx Rhamni ... *Brimstone*, September 2, *R. H. B.*

Hipparchia Janira ... ... *Meadow Brown*, last specimen observed Sept. 30.

Vanessa Atalanta ... ... *Red Admiral*, Sept. 9, — *Tweedale.*

Thecla Quercus ... ... *Purple Hairstreak*, taken in West Woods, Aug. 23, by *C. E. P.*, *H. M. H.*, *A. C. H.*, and *F. J. H. J.*

Smerinthus Ocellatus ... *Eyed Hawk*
S. Populi ... ... *Poplar Hawk*
S. Tiliæ ... ... *Lime Hawk*
} Several larvæ taken during September.

Acherontia Atropos ... *Death's Head.* Four Larvæ, taken near the College Sanatorium. One, found by *C. E. P.*, was fed for some time on Privet, there being no Potatoes obtainable.

Sphinx Ligustri ... ... *Privet Hawk.* Several Larvæ taken. One from ash, by *J. C. P.*, near the Workhouse.

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Hepialus Sylvinus	*Orange Swift.* Taken near the College, Aug. 26, *H. M. H.*
Cerura Vinula	*Puss Moth.* Larvæ taken at Manton Copse, August 22, *C.E. P.*, and *H. M. H.*
Cerura Furcula	*Kitten.* Larva taken near the College Bathing Place, Aug 23, *W. W. D.*
Orgyia Antiqua	*Vapourer.* Oct. 3, *W.W.D.*; said to have been taken at the end of August by *F. J. H. J.*
Lithosia Complanula ...	August 28, — *Fasken.*
Hydræcia Micacea ...	September 7, *C. M. B.*
Heliophobus Popularis ...	September 2, *E. H. W.*
Luperina Testacea ...	August 18, *W. W. D.*, Plentiful at Light.
Agrotis Suffusa ...	October 2, *C. E. P.*, at Light.
Triphæna Janthina ...	August 20, *A. M.*; August 26, — *Churchill.*
T. Fimbria ...	August 26, — *Churchill.*
T. Orbona ...	September 16, *J. C. P.*
Noctua C.-nigrum ...	September 7, *C. M. B.*; September 12, *T. T.*
N. Xanthographa ...	September 4, *J. J. P.*
Anthocelis Lunosa ...	September 9, *C. M. B.*
A. Pistacina	October 3, *C. E. P.*
Epunda Lichenea ...	September 16, *J. B. Oakeley.*
Plusia Chrysitis	August 24, *C. E. P.*
P. Gamma	A specimen in fine condition, Nov 17, *C. M. B.*
Amphipyra Pyramidea ...	September 5, *A. M.*
Mania Maura	August 28, *W. W. D.*
Epione Apiciaria ...	September 8, *W. W. D.*
Ennomos Tiliaria ...	September 9, *F. F. B.*
E. Angularia	August 23, *A. C. H.*
Himera Pennaria ...	November 1, *H. B.*
Halia Wavaria	August 31.
Hibernia Progemmaria ...	December 5, *F. P. M.*
Cheimatobia Brumata ...	November 28, *A. M.*
Eupithecia Rectangulata	August 23, *F. J. H. J.*
Ypsipetes Elutata	August 22, *C. E. P.*, *A. C. H.*, and *H. M. H.*
Phibalapteryx Polygrammata	Preshute, Sept 7: also at Light, Sep. 8, *W.W.D.*
Scotosia Dubitata ...	August 18, *W. W. D.*
S. Certata	August 27, *C. E. P.*
Pyralis Farinalis ...	Before September 5, *W. W. D.*
Crambus Geniculeus ...	Clatford, August 22, *H. M. H.*

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BOTANICAL NOTICES.

The following list, though not so long as usual, presents several interesting features—the number of new localities and new species is unusually great. The reason of this is, that the cold, damp spring retarded vegetation, and consequently, on our return to Marlborough after the holidays, plants were not so far advanced as is usually the case. During August a great deal of work was done, but with September came a cold, damp period, which put a stop to botanizing. In October the weather was finer, but most plants were entirely destroyed, and but little could be done. In consequence of the "Calendar," published in this Report, these Botanical notices have been curtailed as much as possible, and only such observations are recorded as seemed necessary for *adding* to our previous knowledge of the Flora of Marlborough, all facts in confirmation of previous observations have been suppressed. Under these circumstances, the present list must be considered very encouraging, and exhibits a considerable step made in the right direction.

A. C. A.	A. C. Almack.
H. B. A.	H. B. Armstrong.
F. B.....	F. Blackburn.
F. F. B.	F. F. Back.
A. D.....	A. Dolben.
W. W. D.....	W. W. Dayman.
A. H.	A. Herklots.
A. P. H.	A. P. Hockin.
H. M. H.	H. M. Hilton.
R. R. P. H.	R. R. P. Hilton.
H. A. J.	H. A. Johnston.
F. J. H. J.	F. J. H. Jenkinson.
A. M.	A. Marshall.
T. E. M.	T. E. Maclean.
F. P. M.	F. P. Mansfield.
J. J. P.	Rev. J. J. Pulleine.
J. W. P.	J. W. Parrington.
G. F. R.	G. F. Ruck.
H. S. S.	H. S. Sankey.
E. im T.	E. im Thurn.
T. T.	T. Tilleard.
E. H. W.	E. H. Wayman.

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Clematis Vitalba	Traveller's Joy, near Crofton, *J. J. P.*
Ranunculus heterophyllus	Water Crowfoot, still in flower Aug. 23, *A.P.H.*
R. acris	Upright Crowfoot, flower Nov. 30, *E. im. T.*
Papaver Rhœas	Red Poppy, flower Nov. 17, *E. im T.*
Helianthemum vulgare ...	Rock Rose, flower Sept. 9, *A. H.*
Viola sylvatica (b)	Wood Violet, flower Oct. 24, *J. W. P.*
V. tricolor	Heartsease, flower Nov. 30, *E. im T.*
Polygala vulgaris	Milkwort, flower Sept. 24, *A. P. H.*
Saponaria officinalis ...	Soapwort, full flower Sept. 11, *T. T.*, *F. B.*, *A. D.*
Lychnis vespertina ...	White Campion, flower Oct. 21, *T. E. M.*
L. diurna	Red Campion, flower Dec. 5, *J. W. P.*
Stellaria graminea	Lesser Stitchwort, full flower Sept. 11.
Malva moschata	Musk Mallow, in flower till about Sept. 24.
M. sylvestris	Common Mallow, full flower Nov. 11, *H. A. J.*
M. rotundifolia	Dwarf Mallow, full flower Sept. 1, at Mildenhall.
Hypericum quadrangulum ...	St. Peter's-wort, flower Sept. 1, at Mildenhall, *E.H.W.*
H. perforatum	St. John's-wort, over by beginning of Sept.
H. humifusum	Trailing ditto, flower September 11, at Clench, *R.R.P.H.*
H. pulchrum	Upright ditto, in flower Sept. 11.
Æsculus Hippocastanum ...	Horse Chestnut, leafless Nov. 10.
Geranium pratense ...	Crowfoot Crane's-bill, nearly over by end of August.
G. dissectum	Dove's-foot, in flower in September.
G. Columbinum	Long-stalked Crane's-bill, corn-fields near Ivy's Farm, *A.C.A.*; in flower Oct. 24, *J.W.P.*
G. molle	Dove's-foot Crane's-bill, in flower during Aug.
G. Robertianum	Herb Robert, flower Nov. 30, *E. im T.*
Rhamnus Catharticus ...	Buckthorn, in a Pit near Clench.
Ulex nanus	Dwarf Furze, Clench, Sept. 24, *F.P.M.*; Nov. 30, *E. im T.*
Ononis arvensis	Rest Harrow, Forest Hill, Sept. 1, *R.R.P.H.*
O. campestris	Ditto, Mildenhall, Aug. 22; Avebury, Aug. 23.
Anthyllis vulneraria ...	Lady's Fingers, nearly over Aug. 18, *T.E.M.*
Vicia hirsuta	Hairy Tare, Aug. 30.
Agrimonia Eupatoria ...	Agrimony, full flower Aug. 18, *T.E.M.*
A. odorata	Martinsell, Aug. 30; Clench, Sept. 11.
Potentilla Tormentilla ...	Tormentil, in flower Aug. 31, *H.R.A.*
Fragaria vesca	Strawberry, flower Oct. 24, *J.W.P.*

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Rubus cæsius	Dewberry, first fruit Aug. 24, *F.J.H.J.*
Rubus ?	Blackberry, first fruit Aug. 30, *R.R.P.H.*
Geum urbanum	Avens, flower Oct. 24, *J.W.P.*
Epilobium Angustifolium	Rose-bay, between Savernake House and Great Bedwyn—full flower Aug. 30, *J.J.P.*
E. hirsutum	Great Willow-herb, coming into flower Aug. 22.
E. parviflorum	Small Willow-herb, Martinsell, flower Aug. 30.
E. montanum	Broad Willow-herb, Martinsell, flower Aug. 30.
Spergula arvensis	Corn Spurrey—Avebury, full flower Aug. 23.
Sedum Telephium	Orpine, lane leading to Hillcott Mill, Sept. 7, *Greenwell.*
Pimpinella Saxifraga ...	Burnet Saxifrage, Nov. 30., *E. im T.*
Angelica sylvestris... ...	Wild Angelica, in bud Oct. 24, *J.W.P.*
Pastinaca Sativa	Parsnep, full flower Aug. 22.
Heracleum Sphondylium ...	Hogweed, flower Oct. 25, *E. im T. & G.F.R.*
Torilis infesta	Corn Parsley, nearly over Aug. 30, Mildenhall and Clench.
Chærophyllum temulum ...	Rough Chervil, flower Nov. 4, *T.E.M. & H.A.J.*
Hedera Helix	Ivy, first flower Sep. 26, *G.F.R.*
Valeriana officinalis ...	Valerian, still in flower, Aug. 30.
Dipsacus sylvestris ...	Teasel, nearly over, Aug. 22. Rabley Aug. 27, *H.S.S.*
Scabiosa succisa	Devil's-bit, white variety, Sep. 21, *R.R.P.H.*
Eupatorium cannabinum ...	Hemp Agrimony, in flower Sept. 11.
Bellis perennis	Daisy, still in flower Dec. 14. *Glasse.*
Pulicaria dysenterica ...	Fleabane, coming into flower Aug. 22.
Bidens cernua	Bur Marigold, full flower, Sep. 1.
Chrysanthemum leucanthemum	Ox-eye, last flower observed Oct. 26.
C. Segetum	Corn Marigold, Barton Farm, Oct. 25, *E. im T.*
Matricaria inodora ...	Corn Chamomile, last flower observed Nov. 10, *J.W.P.*
Artemisia vulgaris ...	Mugwort, Pewsey-road, near Tan-coat lane; also on Forest-hill, by *R.R.P.H.*, and at Mildenhall, by *E.H.W.*
Tanacetum vulgare ...	Tansy, Tan-coat lane, full flower Aug. 30.
Gnaphalium uliginosum ...	Cudweed, full flower Sep. 21, *W.W.D.*
G. Sylvaticum	Highland Cudweed, Clench, full flower Sep. 11. *W.W.D.*
Senecio Jacobæa	Ragwort, going off about the middle of Aug.; flower as late as Nov. 11, *T.E.M. & H.A.J.*
S. aquaticus	Marsh Ragwort, flower as late as Nov. 4., *T.E.M.*

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Serratula tinctoria ...	Saw-wort, full flower Aug. 22.
Carduus eriophorus... ...	Woolly-headed Thistle, Pewsey-road, near Tancoat lane, full flower Aug. 24, *J.J.P.*
Apargia autumnalis ...	Autumnal Hawkbit, nearly over Oct. 26.
Tragopogon minor ...	Goat's-beard, Forest-hill, Sep. 1.
Leontodon Taraxacum ...	Dandelion, flower as late as Nov. 11, *T. E. M. & H.A.J.*
Sonchus oleraceus ...	Sow-thistle, Preshute, Sep. 8.
S. asper	Sow-thistle, as late as Nov. 11, *A.M.*
S. arvensis	Corn Sow-thistle, plentiful on the railway banks, and at Avebury.
Crepis virens	Smooth Hawk's-beard, flower as late as Oct. 26.
Hieracium vulgatum. ...	Wood Hawkweed, Manton Copse.
H. boreale	Shrubby Hawkweed, Martinsell, Aug. 30. *T.E.M.*
PHYTEUMA ORBICULARE ...	Avebury, nearly over Aug. 23.
Campanula glomerata ...	Clustered Bell-flower, flower as late as Nov. 5.
C. TRACHELIUM	Nettled-leaved Bell-flower, Forest-hill, Sep. 1.
Calluna vulgaris	Ling, full flower Aug. 18, *T.E.M.*, occurs at Row Down, *T.E.M.*, Martinsell, *R.R.P.H.*, and at Avebury.
Fraxinus excelsior	Ash, almost entirely leafless Nov. 10.
*Syringa vulgaris	Lilac, mostly leafless, Nov. 10.
Erythræa Centaurium ...	Centaury, generally over by Sep. 11, flower as late as Oct. 24, *J.W.P.*
Gentiana amarella ...	Felwort, in perfection during September; over by Nov. 5; white varieties found by *G.F.R.*, *H.M.H.*, and *R.R.P.H.*
G. campestris	Field Gentian, plentiful at Clench; Marlborough Common, *H.R.A.*—during September.
Symphytum officinale ...	Comfrey, in flower during September; flower as late as Nov. 4, *T.E.M.* and *H.A.J.*
Verbascum Thapsus ...	Mullein, flower as late as Oct. 21, *E. in T.*; a specimen 6½ feet high, Sept. 21, *R.R.P.H.*
Linaria vulgaris	Yellow Toad-flax, full flower during August. A specimen, approaching the Monstrosity, called Peloria, found on Forest Hill, Sept. 1, by *R.R.P.H.*
Scrophularia aquatica ...	Water Betony, flower as late as Nov. 27, *G.F.R.*
Melampyrum pratense ...	Cow-wheat, in perfection during August.
Pedicularis sylvatica ...	Red Rattle, flower as late as Sept. 24, *A.P.H.*

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Euphrasia officinalis ...	Eye-bright, plentiful during September.
Veronica chamædrys ...	Germander Speedwell, flower Oct. 21, *T.E.M.* and *H.A.J.*
V. serpyllifolia	Thyme-leaved Speedwell, flower Oct. 24, *A.P.H.*
Mentha rotundifolia ...	Round-leaved Mint, not long in flower, Aug. 30.
Lycopus europæus ...	Gipsy-wort, Mildenhall, going off Aug. 22.
Calamintha Clinopodium ...	Wild Basil, going off Aug. 18, flower as late as Oct. 28, *F.F.B.*
Prunella vulgaris	Self-heal, over by Aug. 18, *T. E. M.*
Nepeta Glechoma	Ground Ivy, flower Oct. 21, *T.E.M.* and *H.A.J.*
Lamium purpureum ...	Red Dead-nettle, flower Nov. 25, *T. E. M.* and *H. A. J.*
L. album	White Dead-nettle, flower Nov. 11 (plentiful), *T. E. M.* and *H. A. J.*
Stachys sylvatica	Hedge Woundwort, in perfection during Aug.; a monstrosity with a green lip found near the Workhouse, October 24, by *G. F. R.*
Verbena officinalis	Vervain, Mildenhall, full flower September 1, *E.H.W.*; Bath Road, Sept. 9, *H.M.H.*
Primula vulgaris	Primrose, coming into flower Oct. 24 and 25, *J. W. P.*, *G. F. R.*, and *E. im T.*
Lysimachia Nummularia ...	Moneywort, flower, Mildenhall, Sept. 1.
Anagallis arvensis... ...	Scarlet Pimpernel, flower Oct. 24, *J. W. P.*
Polygonum Persicaria ...	Spotted Persicaria, in flower during October.
P. MINUS	Clench, flower Aug. 30, *R. R. P. H.*
Ulmus suberosa	Common Elm, leafless by Nov. 11.
U. montana	Wych Elm, about a week or 10 days later.
Populus nigra	Black Poplar, leafless Nov. 11.
Habenaria viridis	Frog Orchis, Rabley, Sept. 21, *W. W. D.*
SPIRANTHES AUTUMNALIS ...	Lady's Tresses, fields between Wan's-Dyke and Clench, Sept. 10, *W. W. D.*; also at Sergeant Doole's, *J. J. P.*
Allium vineale	Crow Garlick, near Cadley, *J. J. P.*
Colchicum autumnale ...	Meadow Saffron, flower August 31, *Mrs. Blake.*
Juncus effusus	Soft Rush, at Clench and Mildenhall, Aug. 30 and Sept. 1.
J. CONGLOMERATUS	Mildenhall, Aug. 22.
J. lamprocarpus	Jointed Rush, Mildenhall, Aug. 25.
J. bufonius	Toad Rush, Mildenhall, Aug. 25.
Alisma Plantago	Water Plantain, coming into flower Aug. 22.

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TRIGLOCHIN PALUSTRE	...	Arrow-grass, Mildenhall, in 2 places, Aug. 25.
Potamogeton crispus	...	Frog's Lettuce, Clench.
SCIRPUS LACUSTRIS...	...	Bulrush, Mildenhall.
Phragmites communis	...	Common Reed, full flower Sept. 1.
Sclerochloa rigida ...	...	Hard Meadow Grass, Forest Hill, *H. R. A.*
Equisetum palustre	...	Marsh Horse-tail, Mildenhall.
Athyrium Filix-fœmina	...	Lady-Fern, Wan's-Dyke at Clench, also the variety *rubricaulis*, *A. C. A.*

ORNITHOLOGICAL NOTICES.

Common Crossbill—Flock seen, *J. W. Parrington*, October 12.

Fieldfare—(Turdus pilaris), seen October 31st, *J. W. Parrington*, November 7th, *J. B. Oakeley*.

Redwing—(Turdus iliacus), seen October 22nd, *J. W. Parrington* and *F. Blackburn*.

Reed Warbler—(Salicaria arundinacea), apparently gone September 11th, *J. W. Parrington*.

Kingfisher—(Alcedo ispida), seen August 19th, *T. E. Maclean*, September 1, *G. Lister*, November 10, *E. H. Carr*.

Swallow—(Hirundo rustica), seen October 19th, *A. P. Hockin*, October 30, *H. W. Hockin*, October 31st, *Rev. H. Bell*.

Martin—(Hirundo urbica), seen October 30th, *G. H. Dawson*, November 11, *F. J. H. Jenkinson*, November 12, *A. Herklots*.

Heron—(Ardea cinerea), one seen near Preshute, November 1, *G. H. Dawson*; two seen near Mildenhall, November 10th, *E. H. Carr*.

Woodcock—(Scolopax rusticola), one seen in the Forest, November 3rd, —*Glasse*; one seen in Forest, December 4th, *W. D. Dowding*.

Snipe—(Scolopax gallinago), one seen near Mildenhall, September 10th, *Jenkinson*; one seen November 2nd, *W. D. Dowding*.

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ENTOMOLOGICAL CALENDAR.

The numbers before the species refer to Stainton's "Manual."
Hybernated specimens are indicated by the letter H.

RHOPALOCERA.	1865	1866	1867
2. Gonepteryx Rhamni	...	March 6 } Sept. 2 }	
3. Colias Edusa	H. by June 16.		
6. Pieris Brassicæ	...	April 30.	
7. P. Rapæ	...	April 20.	
8. P. Napi	...	April 22.	
10. Anthocharis Cardamines ...	...	April 22.	
11. Leucophasia Sinapis	...	June 21.	
12. Arge Galathea	June 21.	...	
13. Lasiommata Ægeria... ...	...	June 8.	
14. L. Megæra	...	May 19.	
15. Hipparchia Semele ...	...	...	
16. H. Janira	...	May 23.	
17. H. Tithonus	...	not by June 16.	
18. H. Hyperanthus	...	...	
22. Cœnonympha Pamphilus ...	...	May 19.	
24. Apatura Iris	...	...	
25. Cynthia Cardui	...	H. May 15 } June 13 }	
26. Vanessa Atalanta	...	H. June 22 } Sept. 9 }	
27. V. Io	...	H. March 18.	
28. V. Antiopa	...	...	
29. V. Polychloros	...	H. April 29.	
30. V. Urticæ	...	H. by March 7 } Oct. 2 }	
31. Grapta C.-album	...	April 18.	
32. Argynnis Paphia	...	...	
33. A. Adippe	June 21.	...	
34. A. Aglaia	June 19.	...	
36. A Selene	...	June 1.	
37. A. Euphrosyne	...	May 16.	
38. Melitæa Cinxia	...	...	
39. M. Athalia	...	...	
40. M. Artemis	...	May 22.	

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	1865.	1866.	1867.
41. Nemeobius Lucina		by June 8.	
42. Thecla Betulæ		...	
45. T. Quercus		Aug. 23.	
46. T. Rubi		June 13.	
47. Chrysophanus Phlæas		May 15.	
51. Polyommatus Alsus		May 28.	
53. P. Arion		...	
54. P. Corydon		...	
56. P. Alexis		May 23.	
58. P. Agestis		May 28.	
60. Thymele Alveolus		May 14.	
61. Thanaos Tages		May 16.	
64. Pamphila Linea		...	
65. P. Sylvanus		June 3.	
66. P. Comma		...	
HETEROCERA.			
67. Procris Statices		June 2.	
71. Anthrocera Loniceræ		...	
72. A. Filipendulæ		June 13.	
73. Smerinthus Ocellatus		June 10.	
74. S. Populi		June 8.	
75. S. Tiliæ		...	
76. Acherontia Atropos		larvæ in Sept.	
78. Sphinx Ligustri		larvæ in Sept.	
85. Chærocampa Elpenor		...	
86. C. Porcellus		June 6.	
87. Macroglossa Stellatarum		H. April 22.	
89. Sesia Bombyliformis		...	
91. S. Bembeciformis		...	
104. Hepialus Lupulinus		May 25.	
105. H. Humuli		June 12.	
106. H. Velleda		June 9.	
107. H. Sylvinus		Aug. 26.	
110. Cossus Ligniperda ...		...	
112. Cerura Furcula		larva, Aug. 22.	
114. C. Vinula		larva, Aug. 22.	
118. Notodonta Ziczac		...	
119. Pterostoma Palpina		June 17.	
126. Lophopteryx Camelina		May 15.	
129. Diloba Cæruleocephala		...	
130. Petasia Cassinea		...	

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	1865.	1866.	1867.
135. Pygæra Bucephala	...	May 27.	
139. Dasychira Pudibunda ...	...	...	
141. Orgyia Antiqua	...	October 8.	
142. O. Gonostigma	...	...	
147. Porthesia Auriflua	...	...	
148. Miltochrista Miniata ...	...	...	
153. Lithosia Complanula ...	...	Aug. 21.	
158. Gnophria Rubricollis ...	...	June 21.	
164. Euthemonia Russula ...	...	...	
165. Arctia Caja	...	...	
167. Nemeophila Plantaginis ...	...	May 28.	
168. Phragmatobia Fuliginosa ...	...	May 16.	
169. Spilosoma Menthrasti ...	...	May 22.	
171. S. Lubricepeda	...	June 5.	
172. Diaphora Mendica	...	May 18.	
173. Callimorpha Jacobeæ ...	...	...	
177. Lasiocampa Rubi	...	...	
179. L. Quercus	...	larva, May 5.	
181. Poecilocampa Populi	...	...	
185. Odonestis Potatoria	...	...	
186. Gastropacha Quercifolia ...	...	...	
190. Cilix Spinula	...	May 19.	
193. Drepana Falcataria	...	May 21.	
194. D. Hamula	...	...	
195. D. Unguicula	...	May 24.	
211. Cymatophora Flavicornis ...	...	...	
212. C. Ridens	...	...	

	1866.	1867.
213. Bryophila Perla	...	
217. Acronycta Psi	June 18.	
220. A. Megacephala	...	
222. A. Alni	...	
239. Leucania Impura	...	
256. Hydræcia Micacea	Sept. 7.	
258. Xylophasia Rurea	...	
259. X. Lithoxylea	...	
261. X. Polyodon	June 25.	
269. Heliophobus Popularis ...	Sept. 2.	
274. Luperina Testacea	Aug. 18.	
281. Mamestra Brassicæ ...	May 30.	
282. M. Persicariæ	...	

Digitized by Google

	1866.	1867.
283. Apamea Basilinea	June 14.	
289. A. Oculea	...	
297. Grammesia Trilinea ...	June 3.	
303. Caradrina Cubicularis ...	June 15.	
306. Agrotis Puta	...	
307. A. Suffusa	Oct. 2.	
310. A. Segetum	...	
312. A. Exclamationis	May 26.	
328. Triphæna Janthina	Aug. 20.	
329. T. Fimbria	Aug. 26.	
332. T. Orbona	Sept. 16.	
333. T. Pronuba	April 20.	
336. N. Augur	...	
337. N. Plecta	. .	
338. N. C-nigrum	Sept. 7.	
351. N. Xanthographa	Sept. 4.	
352. Trachea Piniperda	...	
354. Tæniocampa Gothica ...	...	
356. T. Rubricosa	March	
357. T. Instabilis	...	
359. T. Populeti	...	
360. T. Stabilis	...	
363. T. Munda	March	
370. Anthocelis Pistacina	Oct. 3.	
371. A. Lunosa	Sep. 9.	
372. A. Litura	...	
376. Scopelosoma Satellitia ...	...	
384. Xanthia Ferruginea	...	
390. Cosmia Trapezina	...	
393. C. Affinis	...	
396. Dianthœcia Capsincola ...	...	
408. Epunda Lichenea	Sept. 16	
410. Miselia Oxyacanthæ	...	
412. Agriopis Aprilina	...	
413. Phlogophora Meticulosa ...	June 17.	
418. Aplecta Nebulosa	...	
430. Hadena Oleracea	...	
440. Calocampa Exoleta	Nov. 1865.	
444. Cucullia Verbasci	...	
451. C. Umbratica	June 25.	
472. Abrostola Urticæ	June 10.	

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	1866.	1867.
476. Plusia Chrysitis	Aug. 24.	
478. P. Festucæ	...	
479. P. Iota...	...	
481. P. Gamma	June 7.	
483. Gonoptera Libatrix	H. April 18. Sept 30.	
484. Amphipyra Pyramidea ...	Sep. 5.	
485. A. Tragopogonis	...	
486. Mania Typica	June 29.	
487. M. Maura	Aug. 28.	
493. Catocala Nupta	...	
495. Euclidia Mi	May 19.	
496. E. Glyphica	...	
497. Phytometra Ænea	May 23.	
498. Ourapteryx Sambucaria ...	...	
500. Epione Apiciaria	Sep. 8.	
502. Rumia Cratægata	May 26.	
504. Angerona Prunaria	...	
505. Metrocampa Margaritata ...	...	
507. Eurymene Dolobraria ...	...	
509. Selenia Illunaria	June 10.	
512. Odontopera Bidentata ...	June 5.	
513. Crocallis Elinguaria	...	
515. Ennomos Tiliaria	Sept. 9.	
517. E. Erosaria	...	
518. E. Angularia	Aug. 23.	
519. Himera Pennaria	Nov. 1.	
520. Phigalia Pilosaria	...	
524. Amphidasis Prodromaria ...	...	
525. A. Betularia	...	
526. Hemerophila Abruptaria ...	May 15.	
529. Cleora Lichenaria	...	
530. Boarmia Repandata	...	
531. B. Rhomboidaria	...	
537. Tephrosia Crepuscularia ...	...	
553. Iodis Lactearia	May 25.	
555. Hemithea Thymiaria ...	...	
557. Ephyra Punctaria	June 6.	
563. Asthena Luteata	...	
564. A. Candidata	May 23.	
571. Acidalia Scutulata	...	

Digitized by Google

	1866.	1867.
572. A. Bisetata	...	
579. A. Virgularia	...	
585. A. Immutata	...	
591. A. Aversata	...	
595. Bradyepetes Amataria ...	...	
596. Cabera Pusaria	May 28.	
598. C. Exanthemata	May 30.	
599. Corycia Punctata	...	
600. C. Taminata	...	
606. Halia Wavaria	Aug. 31.	
607. Strenia Clathrata	May 19.	
608. Lozogramma Petraria ...	May 19.	
609. Numeria Pulveraria	...	
613. Fidonia Atomaria	May 29.	
614. F. Piniaria	...	
617. Minoa Euphorbiata	June 4.	
622. Abraxas Grossulariata ...	...	
623. A. Ulmata	...	
625. Ligdia Adustata	June 2.	
626. Lomaspilis Marginata ...	May 23.	
628. Hibernia Rupicapraria ...	March 4.	
629. H. Leucophearia	...	
630. H. Aurantiaria	...	
631. H. Progemmaria	by March 7 } Dec. 5. }	
632. H. Defoliaria	...	
633. Anisopteryx Æscularia ...	March 18.	
634. Cheimatobia Brumata ...	Nov. 28.	
644. Laurentia Olivaria	...	
645. L. Miaria	May 28.	
646. Emmelesia Affinitata ...	...	
647. E. Alchemillata	June 21.	
648. E. Albulata	...	
653. E. Blandiata	May 29.	
658. Eupithecia Centaureata ...	March 19.	
678. E. Vulgata	May 26.	
692. E. Rectangulata	Aug. 23.	
706. Ypsipetes Elutata	Aug. 22.	
708. Melanthia Ocellata	June 2.	
710. Melanippe Hastata	June 8.	
712. M. Procellata	...	

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	1866	1867.
713. M. Unangulata	May 27.	
714. M. Rivata	...	
715. M. Biriviata	April 26.	
716. M. Montanata...	May 28.	
718. M. Fluctuata	April 26.	
721. Anticlea Badiata	...	
722. A. Derivata	April 27.	
725. Coremia Propugnata ..	May 22.	
726. C. Ferrugaria	May 2.	
727. C. Unidentaria	...	
729. Camptogramma Bilineata ...	June 6.	
735. Phibalapteryx Polygrammata	Sep. 7.	
737. Scotosia Dubitata	Aug. 18.	
740. S. Certata	Aug. 27.	
743. Cidaria Miata	...	
745. C. Corylata	June 2.	
747. C. Russata	June 7.	
748. C. Immanata	...	
751. C. Prunata	...	
754. C. Fulvata	...	
761. Eubolia Plumbaria	June 21.	
763. E. Lineolata	...	
765. Ansitis Plagiaria	...	
769. Odezia Chærophyllata ...	June 7.	
771. Hypena Proboscidalis ...	...	
779. Herminia Barbalis	...	
780. H. Tarsipennalis	...	
785. Pyralis Farinalis	before Sep. 5.	
787. Aglossa Pinguinalis	...	
790. Pyrausta Punicealis	...	
791. P. Purpuralis	May 22.	
792. P. Ostrinalis	May 22.	
794. Herbula Cespitalis	May 8.	
796. Ennychia Anguinalis... ...	May	
803. Cataclysta Lemnata	...	
809. Botys Pandalis	...	
812. B. Verticalis	...	
814. B. Fuscalis	June 8.	
817. B. Urticata	May 31.	
821. Pionea Forficalis	June 2.	
828. Scopula Lutealis	...	

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	1866.	1867.
829. S. Olivalis	June 10	
834. Nola cucullatella	...	
837. Simaethis Fabriciana ...	May 22	
846. Eudorea Cratægella	...	
857. Aphomia Colonella	...	
859. Achroia Grisella	...	
899. Crambus Pratellus	May 28	
904. C. Pascuellus...	...	
906. C. Hortuellus...	...	
910. C. Geniculeus...	Aug. 22	
912. C. Selacellus	...	
913. C. Tristellus	...	
918. C. Perlellus	...	

BOTANICAL CALENDAR.

The object of publishing this calendar is to secure the dates of flowering of *all* plants in our neighbourhood: from not having a list ready at hand, many plants have not been recorded, and it is hoped, therefore, that this defect will be remedied in future. The list itself, also, is interesting, showing, as it does, how extraordinarily some plants vary in the time of flowering, whilst others are just the reverse. It must be remembered that 1865 was a very remarkable year: plants were in flower then earlier than usual, and most had done flowering by August. In 1866 the spring was peculiarly unfavourable: consequently vegetation was retarded, and many discoveries were made in August. September proved a very wet month, and but little was done after that date.

The numbers before the names of the different species indicate the districts in which they have been found. These districts are bounded by high roads, and are as follows:—

i., between the Bath and Salisbury Roads.
ii., „ Salisbury and Hungerford Roads.
iii., „ Hungerford and New Swindon Roads.
iv., „ New Swindon and Bath Roads.

In this way an approximation towards a knowledge of the *geographical* distribution of the plants is obtained, but much has yet to be determined geologically, ere we can obtain any useful results in this respect.

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In drawing up the list, great care has been taken to record the times when the plants were equally advanced in each year, and also to observe, as far as possible, the *same* plants. Marlborough itself is in a very cold spot, and plants at Silbury, Savernake, and other places, a very few miles off, are generally far more forward than at Marlborough itself. As regards the leafing of trees, so many observations have been recorded, that a very fair idea may be obtained of their progress in each year.

A blank column has been left for observations in 1867: this can be filled up by each person for himself. English names can, in all cases, be obtained from back numbers of the Report; the length of the present list precluding the possibility of adding them here.

The dates given in the following Calendar, unless mentioned to the contrary, are those of the *first flowering* of the Plants. "By" is added when the plant appears to have been in flower a day or two before being observed. An asterisk (*) indicates that the specimen observed was a cultivated one.

i.	ii.	iii.	iv.		1865.	1866.	1867.
				RANUNCULACEÆ.			
				Clematis—			
1	2	3	4	vitalba	.....	.....	
				Thalictrum—			
		3	4	flavum	June 19.	.....	
				Anemone—			
1	2	3	4	nemorosa	April 6	March 18	
				* apennina	April 11.	April 1.	
				Adonis—			
				* autumnalis	May 17.	.....	
				Myosurus—			
1				minimus	.....	by May 5.	
				Ranunculus—			
			4	Drouettii	by May 25.	by April 24.	
1	2	3	4	heterophyllus ...	April 16.	April 18†	
1	2			peltatus	by May 13.	before May 1.	
1				circinatus	.....	.....	
1	2			hederaceus	.....	.....	
	2			sceleratus	.....	.....	
				* gramineus	April 27.	May 12.	
1				Flammula	June 12	May 9.	
1	2	3	4	Ficaria	March 6.	Feb. 10.	
1	2	3	4	auricomus	April 20.	April 16.	
1	2	3	4	acris	May 8.	May 9.	

† Full flower March 25, at Lockeridge.

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i.	ii.	iii.	iv.		1865.	1866.	1867.
1	2	3	4	repens	May 8.	March 17 May 3.	
1	2	3	4	bulbosus	April 24.	April 17.	
	2			hirsutus	.....	.....	
1	2	3	4	arvensis	May 17.	May 23.	
1	2			parviflorus	by May 25.		
				Caltha—			
1	2	3	4	palustris	April 13.	March 21.	
				Trollius—			
				* europæus	.....	May 22.	
				Eranthis—			
				* hyemalis	by Feb. 9.	going off Feb 10	
				Helleborus—			
1	2	3	4	viridis	.....	full flower April 18.	
1				fœtidus	.....	March 24.	
				Aquilegia—			
1	2			vulgaris	by June 11.	* by May 12.	
				BERBERIDACEÆ.			
				Berberis—			
1				vulgaris	.....	bud May 13.	
				* fascicularis	.....	March 18.	
				PAPAVERACEÆ.			
				Papaver—			
1				Argemone	May 23.	by June 13.	
1	2	3	4	Rhœas	June 3.	May 30.	
1	2	3	4	dubium.....	by May 25.	May 27.	
1		3		Lecoqii	May 25.	June 14.	
				* somniferum	June 10.	.....	
				Meconopsis—			
				* cambrica	.....	May 7.	
				Chelidonium—			
1	2	3	4	majus	April 26.	May 1.	
				FUMARIACEÆ.			
				Corydalis—			
				* solida	(bud) April 3	March 29.	
				Fumaria—			
1	2	3	4	officinalis	April 20.	April 26.	
				Dielytra—			
				* spectabilis	nearly out April 19	April 26.	

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i.	ii.	iii.	iv.		1865.	1866.	1867.
				CRUCIFERÆ.			
				Cheiranthus—			
				* Cheiri	.....	Feb. 10. April 10.	
				Nasturtium—			
1		3	4	officinale	by June 3.	June 6.	
				Barbarea—			
1	2	3	4	vulgaris	April 30.	May 16.	
				Arabis—			
1	2	3	4	hirsuta	flower & seed June 7.	April 12.	
				Cardamine—			
1				sylvatica	.....	flow & seed May 5.	
1	2			hirsuta	April 8.	by Feb. 10.	
1	2	3	4	pratensis	April 20.	April 22.	
				Sisymbrium—			
1	2	3	4	officinale	May 4.	June 10.	
1				thalianum	flow & seed May 2.	April 12.	
				Alliaria—			
1	2	3	4	officinalis	bud April 25.	April 28.	
				Brassica—			
1	2	3	4	campestris	April 20.	Feb. 17.	
		•		Napus	.....	.....	
				Lunaria—			
				* biennis	.....	April 13.	
				Sinapis—			
1				nigra	.....	.....	
1	2	3	4	arvensis	April 25.	April 25.	
1	2	3	4	alba	by June 5.	.....	
				Alyssum—			
				* saxatile	April 25.	by May 2.	
				Draba—			
				* aizoides	April 6.	March 17.	
1	2	3	4	verna	April 6.	flow & seed March 10	
				Armoracia—			
				* rusticana	by May 11.	.....	
				Lepidium—			
1			4	campestre	flow. & seed May 17.	bud April 30	

Digitized by Google

i.	ii.	iii.	iv.		1865.	1866.	1867.
				Capsella—			
1	2	3	4	Bursa-pastoris ...	before Ap. 18.	April 16.	
				Senebiera—			
1	2	3	4	coronopus.....	.....	.....	
				Isatis—			
				*tinctoria	May 18.	May 7.	
				Raphanus—			
1				Raphanistrum—	June 27.	May 29.	
				RESEDACEÆ.			
				Reseda—			
1	2			lutea	May 22.	June 9.	
1				Luteola.....	June 10.	.....	
				CISTACEÆ.			
				Helianthemum—			
1	2	3	4	vulgare.....	May 19.	May 22.	
				VIOLACEÆ.			
				Viola—			
1	2	3	4	odorata	March 23.	*Feb. 22 } Feb. 28 }	
1	2	3	4	hirta.....	nearly over April 30 }	March 23	
1	2	3	4	sylvatica	by April 20		
				(a) Reichenbachina	...	April 11	
				(b) Riviniana	...	April 11	
1		3		canina	before May 25	by June 4	
				tricolor	...	May 25	
1	2	3	4	(a) arvensis	April 5	April 17	
				POLYGALACEÆ.			
				Polygala—			
1	2	3	4	vulgaris	April 29	May 7	
				CARYOPHYLLACEÆ.			
				Dianthus—			
				*barbatus	May 31	...	
				*cæsius	...	June 9	
				Soponaria—			
	2	3		officinalis	...	full fl Sep 11	
				Cucubalus—			
				*bacciferus	June 27	...	
				Silene—			
1	2	3	4	inflata	June 3	June 4	

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i.	ii.	iii.	iv.		1865.	1866.	1867.
				Lychnis—			
1	2	3		Flos-cuculi	May 23	by June 7	
1	2	3	4	vespertina	May 13	May 28	
1	2	3	4	diurna	April 16	May 8	
1				Githago	June 7	...	
				Sagina—			
1		3		procumbens.....	by May 31	...	
1				apetala.....	...	...	
	2		4	nodosa	...	...	
				Arenaria—			
1	2	3	4	trinervis	May 3	April 30	
1	2	3	4	serpyllifolia	Seed June 3	May 26	
				Stellaria—			
1	2	3	4	media	March 18	Feb. 18	
1	2	3	4	Holostea	April 24	April 12	
1	2	3	4	graminea	May 23	full fl. June 23	
1				uliginosa	...	about May 16	
				Moenchia—			
	2			erecta	...	...	
				Cerastium—			
1	2	3	4	glomeratum ...	April 26	April 16	
1	2	3	4	triviale.....	May 7	May 21	
				semidecandrum .	...	...	
				* arvense	April 29	May 16	
				MALVACEÆ.			
				Malva—			
1	2	3	4	moschata	June 21	...	
1	2	3	4	sylvestris	May 28	June 19	
1		3		rotundifolia.....	fl. and seed June 18	...	
				TILIACEÆ.			
				Tilia—			
				* parvifolia†.....	leaf April 29.	May 19	
					fl. June 26	not by July 3	
					leafless Nov. 6	Nov. 2	
				HYPERICACEÆ.			
				Hypericum—			
				* calycinum.....	...	...	
	2			* Androsæmum .	...	by June 25	
1		3		quadrangulum...	...	not by July 1	

(†) Leaf April 29, 1864.

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i.	ii.	iii.	iv.		1865.	1866.	1867.
1	2	3	4	perforatum	June 25	not by July 1.	
	2			dubium	...	...	
1	2	3		humifusum	...	not by July 1.	
1	2	3	4	hirsutum	June 19	not by July 1.	
1	2	3		pulchrum	...	June 21	
				ACERACEÆ.			
				Acer—			
1	2	3	4	campestre ‡	leaf Ap. 21	April 27	
					fl. „ 24	May 6	
					leafless ...	...	
				*Pseudo-platanus	leaf Ap. 17	April 14 to May 5	
					fl. Ap. 22	April 27	
					leafless Nov. 6	..	
				ÆSCULACEÆ.			
				Æsculus—			
				*Hippocastanum §	leaf Ap. 22	April 25	
					fl. Ap. 25	May 5	
					leafless Nov. 4	Nov. 10	
				GERANIACEÆ.			
				Geranium—			
1				Phæum	May 8	May 12	
				*sylvaticum ...	by May 18	by May 31	
1	2	3	4	pratense	May 25	June 13	
				*sanguineum ...	May 25	June 9	
		3		pusillum	...	...	
1	2	3	4	dissectum.....	May 17	May 29	
1		3		columbinum.....	June 15	...	
1				rotundifolium ...	April 29	May 12	
1	2	3	4	molle	April 28	April 28	
1		3	4	lucidum	April 27	May 2	
1	2	3	4	robertianum ...	April 27	April 30	
				Erodium—			
1				cicutarium.....	...	...	
				LINACEÆ.			
				Linum—			
1	2	3	4	catharticum.....	May 25	full fl. June 13.	

(‡) Flower May 1, 1864.
(§) Leaf April 28, 1864.

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i.	ii.	iii.	iv.		1865.	1866.	1867.
				OXALIDACEÆ.			
				Oxalis—			
1	2			Acetosella	April 17	full fl. Ap. 23	
				CELASTRACEÆ.			
				Euonymus—			
1	2	3	4	europæus	leaf Ap. 10	April 25	
					fl. May 16	May 29	
					leafless ...	...	
				Staphylea—			
				*pinnata	leaf ...	...	
					fl. ...	May 8	
					leafless ...	...	
				RHAMNACEÆ.			
				Rhamnus—			
1	2	3	4	catharticus	leaf Ap. 23	April 25	
					fl. May 28	June 6	
					leafless ...	...	
				LEGUMINOSÆ.			
				Ulex—			
1	2	3	4	europæus	April 3.	In fl. Feb. 25.	
1				nanus	.....	In fl. Sept. 24.	
				Genista—			
1				tinctoria	.....	bud June 13.	
1				anglica	by May 22.	.....	
				Sarothamnus—			
1				scoparius	May 17.	full fl. May 5.	
				Ononis—			
1	2	3	4	arvensis	.....	June 13.	
1		3	4	campestris	June 26.	.....	
				Medicago—			
1				sativa	.....	.....	
1	2	3	4	lupulina	by April 23.	May 1.	
				Melilotus—			
		3		officinalis	.....	.....	
				Trifolium—			
1	2	3	4	pratense	April 28.	April 30.	
1				arvense.....	.....	.....	
1	2	3	4	repens	May 13.	May 23.	
				* fragiferum	.....	.....	
1		3		procumbens.....	by June 15.	.....	
1	2	3	4	minus	by May 25.	by May 23.	

Digitized by Google

i.	ii.	iii.	iv.		1865.	1866.	1867.
				* incarnatum	May 8.	May 23.	
				Lotus—			
1	2	3	4	corniculatus.....	May 10.	May 28.	
	2			major	.....	.....	
				Anthyllis—			
1		3	4	vulneraria	by June 3.	May 21.	
				Astragalus—			
				* hypoglottis	.....	.....	
				Vicia—			
1		3		hirsuta	fl. and seed June 3.	.....	
1		3	4	tetrasperma.....	fl. and seed June 7.	May 29.	
1		3		sylvatica	June 7.	by June 23.	
1	2	3		Cracca	June 12.	June 19.	
1	2	3	4	sepium	April 19.	April 27.	
1	2	3	4	sativa(angustifolia)	fl. and seed June 7.	May 26.	
				Lathyrus—			
1	2	3	4	pratensis	May 31.	June 11.	
1				sylvestris.....	.....	.....	
1	2	3		macrorrhizus ...	April 24.	April 24.	
				Hippocrepis—			
1		3		comosa	May 13.	May 29.	
				Onobrychis—			
1	2	3		sativa	May 19.	May 28.	
				Cytisus—			
				*Laburnum	May 5.	May 15 to June 9.	
				ROSACEÆ.			
				Prunus—			
				communis			
1	2	3	4	(a) spinosa	leaf	.....	
					fl. Ap. 16.	April 8.	
					leafless	.....	
1	2	3	4	(b) insititia	leaf	March 30.	
					fl. Ap. 21.	March 28.	
					leafless	.....	
1				Avium	leaf Ap. 23.	April 17.	
					fl. Ap. 16.	April 18.	
					leafless	.....	

Digitized by Google

i.	ii.	iii.	iv.		1865.	1866.	1867.
1	2	3		Cerasus	leaf	.....	
					flower	.....	
					leafless	.....	
				*Padus	leaf	.....	
					fl. by Ap. 29	.....	
					leafless	.....	
				* Lauro-cerasus ...	April 27.	full fl. May 16.	
				Spiræa—			
1	2	3	4	Ulmaria	June 14.	not by July 1.	
1		3	4	Filipendula	June 18.	.....	
				Sanguisorba —			
1	2	3	4	officinalis	May 13.	May 13.	
				Poterium—			
1	2	3	4	Sanguisorba ...	April 30.	May 3.	
				Agrimonia—			
1	2	3	4	Eupatoria.....	by June 7.	.....	
1				odorata	.....	.....	
				Alchemilla—			
1	2	3		vulgaris	May 3.	May 5.	
1	2	3	4	arvensis	by Ap. 20.	March 17.	
				Sibbaldia—			
				*procumbens ...	April 22.	May 16.	
				Potentilla—			
1	2	3	4	anserina	May 12.	May 21.	
1				reptans.....	May 24.	.....	
1	2	3	4	Tormentilla	April 29.	May 9.	
1	2	3	4	fragariastrum ...	April 7.	Feb. 17.	
				Fragaria—			
1	2	3	4	vesca	fl. April 21.	April 25.	
					fruit June 7.	June 23.	
1				elatior	.....	April 30.	
				Rubus—			
1				Idæus	May 25.	June 4.	
1	2	3	4	cæsius	May 21.	June 1.	
				—?	June 11.	June 6.	
				Geum—			
1	2	3	4	urbanum	April 25.	by May 4.	
1	2	3		rivale	April 25.	April 1.	
				Rosa—			
1				micrantha	June 11.	by June 23.	
1	2	3	4	canina	May 22.	June 9.	

Digitized by Google

i.	ii.	iii.	iv.		1865.	1866.	1867.
1	2	3	4	arvensis	May 24.	bud June 11.	
				Cratægus—			
1	2	3	4	Oxyacantha † ...	leaf Ap. 10	March 11-19	
					fl. May. 7	May 14-31.	
					leafless ...	.....	
				Pyrus—			
1		3		Malus	April 25.	May 9.	
				*aucuparia	May 6.	May 20.	
1		3		Aria	full leaf May 13.	.....	
				*Japonica	April 8.	Feb. 10.	
				apple	bud Ap. 9.	April 27.	
				apricot	by April 10.	March 31.	
				almond	.....	May 10.	
				peach	.....	March 21.	
				pear	.....	Ap. 20-26.	
				plum.....	April 9.	April 1.	
				LYTHRACEÆ.			
				Peplis—			
1				Portula.....	.....	.....	
				ONAGRACEÆ.			
				Epilobium—			
	2			angustifolium ...	.....	full fl. Aug. 30.	
1	2	3	4	hirsutum	.....	by Aug. 22.	
1		3		parviflorum	.....	in fl. Aug. 30.	
1		3		montanum	June 5.	June 13.	
				Circæa—			
1	2			lutetiana	about June 26	.....	
				HALORAGACEÆ.			
				Myriophyllum—			
1				spicatum	.....	.....	
				PORTULACEÆ.			
				Montia—			
	2			fontana.....	.....	seed May 23.	
				CUCURBITACEÆ.			
				Bryonia—			
1	2	3	4	dioica	June 1.	.....	
				PARONYCHIACEÆ.			
				Spergula—			
1			4	arvensis	bud May 25.	fl. and seed May 15.	

† Flower May 15, 1864.

Digitized by Google

i.	ii.	iii.	iv.		1865.	1866.	1867.
				Scleranthus—			
1				annuus.....	.....	May 15.	
				CRASSULACEÆ.			
				Sedum—			
				* Rhodiola	April 27.	May 7.	
1		3		Telephium	.....	.....	
		3		album	.....	.....	
			4	anglicum	.....	.....	
1	2		4	acre	June 10.	full fl. June 20	
1				reflexum	.....	.....	
				Sempervivum—			
1		3		tectorum	.....	.....	
				GROSSULARIACEÆ.			
				Ribes—			
				* Grossularia	full leaf Ap. 8. fl April 1.		
1				nigrum	.....	.....	
1	2	3	4	rubrum.....	April 13.	April 9-14.	
				* sanguinea.....	April 15.	April 1-8.	
				* aureum	nearly out April 19	by April 18.	
				SAXIFRAGACEÆ.			
				Saxifraga—			
				*umbrosa.....	.....	May 8.	
				*Geum	.....	May 7.	
				*hirsuta	.....	.....	
				*spathulata.....	April 25.	.....	
1	2	3	4	tridactylites.....	April 20.	April 12.	
1	2	3	4	granulata.....	April 30.	May 8.	
				Philadelphus—			
				*coronarius	May 30.	June 8.	
				Chrysosplenium—			
1				oppositifolium...	.....	.....	
				UMBELLIFERÆ.			
				Hydrocotyle—			
1				vulgaris	.....	.....	
				Sanicula—			
1	2	3	4	europæa	May 3.	May 7.	
				Helosciadium—			
1		3		nodiflorum	.....	.....	
				Ægopodium—			
1		3		Podagraria	by May 24.	June 1.	

Digitized by Google

i.	ii.	iii.	iv.		1865.	1866.	1867.
				Bunium—			
1	2	3	4	flexuosum	May 12.	May 22.	
				Pimpinella—			
1	2	3	4	Saxifraga	April 23.	bud Feb. 21.	
				Sium—			
1		3		angustifolium ...	.....	.....	
				Bupleurum—			
				*falcatum	nearly out May 1.	.....	
				Œnanthe—			
1		3		crocata	.....	June 6.	
1				fluviatilis	.....	.....	
				Æthusa—			
1	2	3	4	Cynapium	May 19.	.....	
				Meum—			
				*athamanticum .	nearly out May 1.		
				Angelica—			
1	2	3	4	sylvestris	.....	.....	
				Archangelica—			
				*officinalis	.....	.....	
				Pastinaca—			
1	2	3	4	sativa	June 27.	full bud May 13	
				Heracleum—			
1	2	3	4	Sphondylium—	May 3.	June 4.	
				Daucus—			
1	2	3	4	Carota	June 12.	May 26.	
				Torilis—			
1	2	3	4	Anthriscus	bud June 12.	June 4.	
1		3		infesta	.....	.....	
				Scandix—			
1	2	3	4	Pecten-Veneris	April 25.	May 9.	
				Anthriscus—			
1	2	3	4	sylvestris	April 21.	April 13.	
				Chærophyllum—			
1	2	3	4	temulum	May 26.	bud June 11.	
				Myrrhis—			
				*odorata	.....	.....	
				Conium—			
1				maculatum ...	.....	.....	

Digitized by Google

i.	ii.	iii.	iv.		1865.	1866.	1867.
				ARALIACEÆ.			
				Adoxa—			
1	2	3	4	Moschatellina ...	April 1.	March 30.	
				Hedera—			
1	2	3	4	Helix.....	September 19	Sept. 26.	
				CORNACEÆ.			
				Cornus—			
1	2	3	4	sanguinea.....	leaf April 21.	.....	
					fl. June 4.	May 21.	
					leafless ...	.....	
				CAPRIFOLIACEÆ.			
				Sambucus—			
1	2	3	4	nigra.....	leaf Feb. 24 to April 23.	March 11.	
					fl. May 8.	June 2.	
					leafless ...	.....	
				Virburnum—			
1	2	3	4	Lantana (†).....	leaf ...	April 15.	
					fl. April 29.	May 5.	
					leafless ...	.....	
1	2	3		opulus	leaf ...	April 30.	
					fl. May 25 May 28.	June 3.	
					leafless ...		
				*Laurustinus ...	April 5.	Feb. 10,	
				Lonicera—			
				*Caprifolium ...	May 11.	May 20.	
1	2	3	4	Periclymenum...	June 12.	June 6.	
				Symphoricarpos—			
				*racemosus	June 5.	by June 28.	
				RUBIACEÆ.			
				Sherardia—			
1	2	3	4	arvensis	April 30.	May 4.	
				Asperula—			
1	2		4	cynanchica	by June 3.	June 23.	
1	2	3	4	odorata.....	May 3.	May 7.	
				Galium—			
1	2	3	4	cruciatum.....	April 24.	April 27.	
1	2	3	4	Aparine	May 3.	May 10.	
1	2	3	4	Mollugo	June 14.	June 15.	

(†) Flower May 4, 1864.

Digitized by Google

i.	ii.	iii.	iv.		1865.	1866.	1867.
1	2	3	4	verum	June 19.	nearly out June 29.	
1	2	3	4	saxatile.....	May 23.	June 7.	
1				palustre	.....	.....	
				Rubia—			
				* peregrina	.....	.....	
				VALERIANACEÆ.			
				Centranthus—			
				* ruber.....	.....	May 23.	
				Valeriana—			
1	2	3	4	officinalis	June 7.	June 21.	
1	2	3	4	dioica	May 10.	May 3.	
				Valerianella—			
1		3		olitoria	April 25.	April 27.	
1				dentata	.....	June 21.	
				DIPSACACEÆ.			
				Dipsacus—			
1	2	3	4	sylvestris	.....	.....	
				Knautia—			
1	2	3	4	arvensis	June 7.	June 8.	
				Scabiosa—			
1	2	3	4	succisa	.....	.....	
1	2	3	4	Columbaria	June 7.	.....	
				COMPOSITÆ.			
				Eupatorium—			
1	2	3		cannabinum.....	nearly out June 27.	.....	
				Petasites—			
1	2	3	4	vulgaris	April 10.	March 9.	
				Tussilago—			
1	2	3	4	farfara	April 1.	Feb. 23.	
				Bellis—			
1	2	3	4	perennis	March 31.	Feb. 18.	
				Solidago—			
1				Virgaurea.....	.....	.....	
				Inula—			
				*Helenium	.....	.....	
				Pulicaria—			
1	2	3	4	dysenterica	.....	by Aug. 22.	
				Bidens—			
	2			cernua	.....	full fl. Sep. 1.	

Digitized by Google

i.	ii.	iii.	iv.		1865.	1866.	1867.
				Achillea—			
				*Ptarmica	.....	.....	
				*tomentosa	.....	by June 9.	
1	2	3	4	Millefolium	May 23.	June 21.	
				Anthemis—			
1				arvensis	May 26.	June 8.	
1	2	3	4	Cotula	.....	June 19.	
1				nobilis	.....	.....	
				Matricaria—			
1				Parthenium.....	June 13.	.....	
1	2	3	4	inodora.....	May 28.	May 20.	
				Chrysanthemum—			
1	2	3	4	Leucanthemum .	May 12.	May 20.	
			4	segetum	.....	.....	
				Artemisia—			
				*Absinthium ...	.....	.....	
1	2	3		vulgaris	.....	.....	
				Tanacetum—			
1				vulgare.....	.....	.....	
				Filago—			
1				germanica	June 10.	June 14.	
				Gnaphalium—			
1		3		uliginosum	.....	.....	
1				sylvaticum	.....	full fl. Sep. 11.	
				Doronicum—			
				*Pardaliauches .	April 30.	May 2.	
				Senecio—			
1	2	3	4	vulgaris	before Ap. 4.	all the year.	
1	2	3	4	Jacobæa	June 14.	not out June 29	
1	2	3	4	aquaticus	June 4.	.....	
		3		campestris	{ May 23. Stonehenge	bud May 21.	
				Carlina—			
1	2	3	4	vulgaris	.....	.....	
				Arctium—			
1	2	3	4	majus	{ nearly out June 26.	.....	
				Serratula—			
		3		tinctoria.....	.....	full fl. Aug. 22	
				Centaurea—			
1	2	3	4	nigra.....	June 7.	bud June 11.	
1				Cyanus.....	.....	.....	

Digitized by Google

i.	ii.	iii.	iv.		1865.	1866.	1867.
1	2	3	4	Scabiosa	June 7.	June 8.	
				Carduus—			
1	2	3	4	nutans	nearly out June 3.	.....	
1	2	3	4	crispus	May 20.	May 21.	
1	2	3	4	lanceolatus	.....	not out June 29	
1	2			eriophorus	.....	full fl. Aug. 24	
1	2	3	4	arvensis	by June 12.	.....	
1	2	3	4	palustris	May 30.	June 13.	
1	2	3	4	acaulis	June 11.	.....	
				Silybum—			
				*marianum	about June 14	June 9.	
				Lapsana—			
1	2	3	4	communis.....	June 15.	June 28.	
				Cichorium—			
1		3		Intybus	.....	.....	
				Hypochœris—			
1	2	3		radicata	May 23.	June 3.	
				Apargia—			
1	2	3	4	hispida	May 28.	May 29.	
1	2	3	4	autumnalis	.....	.....	
				Tragopogon—			
1	2			minor	June 3.	June 7.	
				*porrifolius	.....	May 22.	
				Leontodon—			
1	2	3	4	Taraxacum	March 12.	Feb. 17.	
				Sonchus—			
1		3		oleraceus	June 27.	May 29.	
1	2	3	4	asper.....	May 9.	May 29.	
1	2	3	4	arvensis	bud June 12.	.....	
				Mulgedium—			
				* alpinum	June 25.	.....	
				Crepis—			
1	2	3	4	virens	May 23.	June 8.	
		3		biennis	.....	May 28.	
				Hieracium—			
1	2	3	4	Pilosella	May 21.	May 22.	
				* aurantiacum ...	.....	.....	
		3		vulgatum	.....	.....	
				* umbellatum ...	.....	.....	
1				boreale	.....	June 14.	

Digitized by Google

i.	ii.	iii.	iv.		1865.	1866.	1867.
				Helianthus—			
				* tuberosus.....	October 7.	.....	
				CAMPANULACEÆ.			
				Phyteuma			
			4	orbiculare.....	.....	.....	
				Campanula—			
1		3	4	glomerata.....	June 25.	June 21.	
				* latifolia	June 20.	.....	
		3		Trachelium	.....	.....	
1	2	3	4	rotundifolia.....	June 18.	.....	
				* rapunculoides..	June 26.	.....	
				ERICACEÆ.			
				Calluna—			
1	2	3	4	vulgaris	.....	.....	
				Monotropa—			
	2			Hypopitys	.....	.....	
				Rhododendron—			
				—?	April 26.	by May 20.	
				AQUIFOLIACEÆ.			
				Ilex—			
1	2	3	4	Aquifolium	May 11.	May 24.	
				OLEACEÆ.			
				Ligustrum—			
				* vulgare	June 12.	green Ap. 25.	
				Fraxinus—			
1	2	3	4	excelsior †	leaf April 24.	May 10.	
					fl. by April 25	by April 25.	
					leafless Nv. 10	Nov. 10.	
				Syringa—			
				* vulgaris‡	April 29.	May 7.	
				APOCYNACEÆ.			
				Vinca—			
1	2			minor	April 5.	in fl. March 8	
1				major	April 23.	April 15.	
				GENTIANACEÆ.			
				Erythræa—			
1	2	3		Centaurium	June 16.	.....	

† Leaf May 6, 1864.

‡ Flower May 5, 1864.

Digitized by Google

i.	ii.	iii.	iv.		1865.	1866.	1867.
				Gentiana—			
1	2	3	4	Amarella	.....	.....	
1		3		campestris	.....	.....	
				*acaulis	April 18.	by April 3.	
				Menyanthes—			
		3		trifoliata	by May 26.	by June 6.	
				CONVOLVULACEÆ.			
				Convolvulus—			
1	2	3	4	arvensis	May 28.	June 14.	
1	2	3	4	sepium	June 24.	.....	
				Cuscuta—			
				Epithymum	.....	.....	
				BORAGINACEÆ.			
				Cynoglossum—			
1	2			officinale	May 13.	June 6.	
				Borago—			
				*officinalis—	by May 17.	.....	
				Lycopsis—			
1				arvensis	.....	.....	
				Symphytum—			
1	2	3	4	officinale	April 30.	April 28.	
				*asperrimum ...	by June 12.	.....	
				Echium—			
		3		vulgare	by June 18	.....	
				Pulmonaria—			
				*officinalis	full fl. April 15	April 8.	
				Lithospermum—			
1		3	4	arvense.....	April 29.	April 23.	
				Myosotis—			
1	2	3	4	palustris	June 3.	.....	
1	2	3	4	arvensis	April 30.	April 16.	
1		3	4	collina	by April 30.	by April 23.	
1				versicolor.....	May 25.	{ fl. & seed May 22.	
				SOLANACEÆ.			
				Solanum—			
				*nigrum	.....	.....	
1	2	3	4	Dulcamara	May 23.	June 11.	
				Atropa—			
				* Belladonna ...	May 24.	June 9.	
				Hyoscyamus—			
1	2	3		niger	by June 4.	June 6.	

Digitized by Google

i.	ii.	iii.	iv.		1865.	1866.	1867.
				Solanum—			
				* tuberosum ...	June 6.	.....	
				OROBANCHACEÆ.			
				Orobanche—			
	2			elatior	full fl. June 23	.....	
1	2	3	4	minor	by June 19.	June 15.	
				Lathræa—			
1	2			squamaria	April 24.	March 30.	
				SCROPHULARIACEÆ.			
				Verbascum—			
1	2	3		Thapsus	June 11.	June 25.	
1				nigrum	.....	.....	
				Digitalis—			
				* purpurea	about June 3	June 9.	
				Antirrhinum—			
				* majus.....	May 31.	.....	
				Linaria—			
1	2	3		Cymbalaria	by May 11.	April 26.	
1				minor	June 5.	.....	
1	2	3	4	vulgaris	June 6.	June 11.	
				Scrophularia—			
1	2	3	4	nodosa	June 2.	May 29.	
1	2	3	4	aquatica	June 8.	.....	
				* vernalis.....	.....	April 1.	
				Melampyrum--			
1	2	3		pratense	May 23.	May 26.	
				Mimulus—			
		3		luteus	by June 11.	.....	
				Pedicularis—			
1	2		4	sylvatica	May 5.	April 30.	
				Rhinanthus--			
1	2	3	4	Crista-galli	May 23.	May 26.	
				Euphrasia—			
1	2	3	4	officinalis	.....	.....	
1	2	3	4	Odontites	June 16.	June 25.	
				Veronica—			
1		3		Anagallis	.....	.....	
1	2	3	4	Beccabunga	May 13.	June 6.	
1	2	3	4	Chamædrys	April 27.	April 28.	
1	2	3	4	officinalis	Jnne 12.	Juno 19.	
1	2	3	4	serpyllifolia	April 24.	May 7.	

Digitized by Google

i.	ii.	iii.	iv.		1865.	1866.	1867.
1	2	3	4	arvensis	seed May 25.	May 15.	
1	2	3	4	agrestis	April 26.	fl. and seed Feb. 17.	
1		3	4	polita	before Mar. 18	March 30.	
1	2			Buxbaumii	April 4.	Feb. 21.	
1	2	3	4	hederifolia	before April 4	Feb. 20.	
				LABIATÆ.			
				Mentha—			
1				rotundifolia	.....	by Aug. 30.	
1	2	3	4	aquatica	.....	.....	
1	2	3	4	arvensis	.....	.....	
				Lycopus—			
1	2	3		europæus	.....	.....	
				Salvia—			
		3		* verbenaca.....	May 14.	bud May 16.	
				Origanum—			
1				vulgare	.....	.....	
				Thymus—			
1	2	3	4	serpyllum	bud June 3 †	June 4.	
1				Chamædrys	.....	.....	
				Calamintha—			
		3		officinalis	.....	.....	
1				Acinos	.....	.....	
1	2	3	4	Clinopodium ...	.....	.....	
				Scutellaria—			
1				galericulata	.....	.....	
				Prunella—			
1	2	3	4	vulgaris	June 11.	June 25.	
				Nepeta—			
1	2	3	4	Glechoma.....	April 9.	March 24.	
				Lamium—			
1	2	3	4	amplexicaule ...	by April 17.	April 28.	
1	2	3	4	purpureum	before Ap. 6.	all the year.	
1	2	3	4	album	April 13.	April 1.	
				* maculatum ...	.....	by Ap. 1.	
1	2	3	4	Galeobdolon.....	April 25.	April 30.	
				Galeopsis—			
1	2	3	4	Ladanum	June 18.	.....	
1	2	3	4	Tetrahit	.....	.....	

† In flower May 11, at Silbury.

Digitized by Google

i.	ii.	iii.	iv.		1865.	1866.	1867.
				Stachys—			
1	2	3	4	Betonica	June 22.	... ..	
1	2	3	4	sylvatica	June 3.	June 11.	
1		3	4	palustris	.....	.....	
1				arvensis	.....	.....	
				Ballota—			
1	2	3	4	fœtida	.....	bud April 30.	
				Teucrium—			
1				Scorodonia	.....	.....	
				Ajuga—			
1	2	3	4	reptans.....	April 29.	May 5.	
				VERBENACEÆ.			
				Verbena—			
1		3		officinalis	June 27.	full fl. Sep. 1	
				PRIMULACEÆ.			
				Primula—			
1	2	3	4	vulgaris	April 1.	in fl. in Ap. a few in Feb	
1	2	3	4	veris	April 7.	Ap. 5.	
				Lysimachia—			
				* thyrsiflora	.....	.. ...	
	2	3		Nummularia ...	about June 17	.....	
1	2			nemorum	June 6.	.....	
				Anagallis—			
1	2	3	4	arvensis	June 20.	May 23.	
				PLANTAGINACEÆ.			
				Plantago—			
1	2	3	4	lanceolata.....	April 24.	April 23.	
1	2	3	4	media	May 23.	June 4.	
1	2	3	4	major	by June 7.	not by July 1	
				CHENOPODIACEÆ.			
				Chenopodium—			
1	2	3	4	album	bud June 12.	.....	
1		3	4	Bonus Henricus.	April 27.	May 6.	
				Atriplex—			
1	2	3	4	angustifolia.....	.....	.....	
				POLYGONACEÆ.			
				Rumex—			
1	2	3	4	conglomeratus...	June 20.	June 28.	
1	2	3	4	sanguineus	June 18.	.....	
1				pulcher.....	.....	.....	

Digitized by Google

i.	ii.	iii.	iv.		1865.	1866.	1867.
1	2	3	4	obtusifolius	June 7.	by June 28.	
1	2	3	4	crispus	June 7.	June 28.	
1	2	3		Hydrolapathum .	.....	.....	
1	2	3	4	acetosa	April 21.	April 30.	
1	2	3	4	Acetosella	by May 25.	May 26.	
				Polygonum—			
1		3		Bistorta	by May 28.	.....	
1		3		amphibium	.....	.....	
1	2	3	4	lapathifolium ...	.....	.....	
1	2	3	4	Persicaria.....	June 10.	.....	
1				minus	.....	.....	
1	2	3	4	aviculare	June 15.	not by June 28	
1	2	3	4	convolvulus	June 7.	.....	
				THYMELACEÆ.			
				Daphne—			
				*Mezereum	.....	full fl. Ap. 12.	
1				Laureola	.....	.....	
				SANTALACEÆ.			
				Thesium—			
1		3		humifusum	.....	.....	
				ARISTOLOCHIACEÆ.			
				Asarum—			
				*europæum	April 11.	April 1.	
				EUPHORBIACEÆ.			
				Buxus—			
				*sempervirens ...	April 29.	March 25.	
				Euphorbia—			
1	2	3	4	Helioscopia	April 20.	.....	
1	2	3		amygdaloides ...	April 21.	April 30.	
1	2	3	4	Peplus	.....	.....	
1	2	3	4	exigua	.....	.....	
				* Lathyris	.....	.....	
				Mercurialis—			
1	2	3	4	perennis	March 27.	Feb. 18 & 26.	
				CALLITRICHACEÆ.			
				Callitriche—			
1	2	3	4	verna	.....	.....	
1				hamulata	.....	.....	
				URTICACEÆ.			
				Parietaria—			
				* diffusa	.....	.....	

Digitized by Google

i.	ii.	iii.	iv.		1863.	1866.	1867.
				Urtica—			
1	2	3	4	urens	May 13.	March 10.	
1	2	3	4	dioica	by June 6.	May 15.	
				Humulus—			
1	2	3		Lupulus	.....	.....	
				ULMACEÆ.			
				Ulmus—			
1	2	3	4	suberosa†.....	leaf April 11.	(full) May 22.	
					fl. April 8.	seed April 27.	
					leafless Nv 22.	by Nov. 11.	
1	2	3	4	montana	leaf	(full) May 31.	
					fl.	March 3.	
					leafless Nv 22.	about Nov. 21.	
				AMENTIFERÆ.			
				Salix—			
		3		alba	leaf April 13.	.....	
					fl. April 1.	.....	
					leafless ...	.....	
1	2	3	4	caprea	leaf ...	.....	
					fl. ...	March 11.	
					leafless ...	.....	
				Populus—			
1				alba	leaf ...	April 30.	
					fl. ...	.....	
					leafless ...	.....	
1	2	3	4	nigra.....	leaf June 11.	about June 10	
					fl. by Ap. 18, at Avebury.		
					leafless ...	Nov. 11.	
				*fastigiata	leaf ...	.....	
					fl. ...	.....	
					leafless ...	.....	
				Betula—			
1	2	3		glutinosa	leaf ...	April 25.	
					fl. Ap. 17.	May 2 and 5.	
					leafless Nov. 6	.....	

† Leaf May 15, 1864.

Digitized by Google

i.	ii.	iii.	iv.		1865.	1866.	1867.
				Fagus—			
1	2	3	4	sylvatica †	leaf April 22.	{ May 13. some Ap. 24	
					fl. bud Ap. 24.	May 4.	
					leafless by Nov. 6		
				Castanea—			
1				*vulgaris ‡	leaf ...	.....	
					fl. bud May 23	bud June 11.	
					leafless Sep 21		
				Quercus—			
1	2	3	4	Robur §	leaf April 26.	full May 23.	
					fl. April 24.	{ nearly out May 2.	
					not by Nov. 22		
				Corylus—			
1	2	3	4	Avellana ||	leaf April 27.	young Ap. 2.	
					{ fl. Feb. 24, March 10.	February 12. February 21.	
					November 6.		
				Carpinus—			
1	2		4	Betulus.....	leaf ...	.....	
					fl. April 17.	by May 7.	
					leafless ...	.....	
				CONIFERÆ.			
				Taxus—			
1		3		baccata	April 27.	Feb. 21.	
				Juniperus—			
1				communis.....	.....	.....	
				Pinus—			
1	2	3	4	sylvestris	.....	May 9.	
				Larix—			
				*europæa	leaf	April 25.	
					fl. April 17.	by April 1.	
					leafless...	.....	
				TRILLIACEÆ.			
				Paris—			
				* quadrifolia ...	April 27.	May 2.	

† Leaf April 28th, 1864.
‡ Leaf May 9th, 1864.
§ Leaf April 28th, 1864.
|| Leaf April 28th, 1864.

Digitized by Google

i.	ii.	iii.	iv.		1865.	1866.	1867.
				DIOSCOREACEÆ.			
				Tamus—			
1	2	3	4	communis	May 28.	June 10.	
				HYDROCHARIDACEÆ.			
				Anacharis—			
1				Alsinastrum.....	.....	.....	
				ORCHIDACEÆ.			
				Orchis—			
1	2	3	4	Morio	April 29.	May 5.	
1	2	3	4	mascula	April 24.	April 24.	
1			4	ustulata	May 23.	May 29.	
1	2	3	4	maculata	May 23.	June 6.	
1		3		latifolia	May 25.	.....	
1				pyramidalis	.....	June 21.	
				Gymnadenia—			
1				conopsea	June 5.	June 21.	
				Habenaria—			
	2	3		viridis	.....	June 9.	
1	2			bifolia	.....	.....	
1	2	3	4	chlorantha	by May 21.	June 11.	
				Ophrys—			
1				apifera	.....	June 17.	
				Herminium—			
1				monorchis	... ..	.....	
				Spiranthes—			
1				autumnalis	.....	Sept. 10.	
				Listera—			
1	2	3	4	ovata	May 24.	May 21.	
				Neottia—			
1	2	3		Nidus-avis	May 19.	May 29.	
				Epipactis—			
1	2			latifolia.....	.....	.....	
				Cephalanthera—			
		3		grandiflora	by June 7.	.....	
				IRIDACEÆ.			
				Sisyrinchium—			
				*anceps.....	.....	.....	
				Iris—			
1	2	3	4	Pseud-acorus ...	May 27.	by June 6.	
1				fœtidissima	.....	.....	
				*germanica	.....	May 22.	

Digitized by Google

i.	ii.	iii.	iv.		1865.	1866.	1867.
				Crocus—			
				*	during March full fl. Feb. 10.		
				AMARYLLIDACEÆ.			
				Narcissus—			
1				poeticus	*April 18.	.....	
1				Pseudo-narcissus	bud Ap. 1.	March 6 (†)	
				Leucojum—			
				*æstivum	April 16.	April 10.	
				Galanthus—			
1			4	nivalis	Feb. 20.	full fl. Feb 10	
				ASPARAGACEÆ.			
				Convallaria—			
				*majalis	full bud Ap. 27	about May 19	
				Polygonatum—			
1	2	3		multiflorum	May 13.	May 21.	
				Ruscus—			
				*aculeatus	.....	.....	
				LILIACEÆ.			
				Tulipa—			
1				sylvestris.....	*April 27.	full fl. Ap. 23.	
				Fritillaria—			
				*Meleagris	by April 16.	about Ap. 3.	
				*imperialis	April 17.	April 10-17.	
				Ornithogalum—			
1				umbellatum	*May 9.	*May 7.	
1				pyrenaicum	.....	.....	
				Scilla—			
				*bifolia.....	March 21.	Feb. 10.	
				*Sibirica	Feb. 27.	by Feb. 10.	
				Allium—			
1		3		vineale	.....	.....	
				* Schœnoprasum	.....	June 9.	
1				ursinum	by May 20.	.....	
				* molle	April 25.	May 12.	
				Endymion—			
1	2	3	4	nutans	April 16.	April 13.	
				Muscari—			
				*racemosum ...	April 16.	April 1.	

† One Flower in a warm garden, February 8.

Digitized by Google

i.	ii.	iii.	iv.		1865.	1866.	1867.
				COLCHICACEÆ.			
				Colchicum—			
1	2	3		autumnale	.....	Aug. 31.	
				JUNCACEÆ.			
				Juncus—			
1		3		effusus	.....	bud June 13.	
		3		conglomeratus...	.....	.....	
		3		glaucus.....	bud June 18.	.....	
1		3		lamprocarpus ...	.....	.....	
1		3		bufonius	.....	.....	
				Luzula—			
1	2	3		pilosa	seed April 29.	April 4.	
1	2	3	4	campestris	April 14.	April 30.	
				ALISMACEÆ.			
				Alisma—			
1	2	3	4	Plantago	June 24.	.....	
				Sagittaria—			
1				sagittifolia	.....	.....	
				Butomus—			
1		3		umbellatus	.....	.....	
				Triglochin—			
		3		palustre	.....	by Aug. 25.	
				TYPHACEÆ.			
				Sparganium—			
1	2	3	4	ramosum	nearly out June 24.	.....	
1		3		Simplex	June 25.	.....	
				ARACEÆ.			
				Arum—			
1	2	3	4	maculatum	April 26.	April 19	
				LEMNACEÆ.			
				Lemna—			
1	2	3	4	minor	.....	.....	
				POTAMOGETONACEÆ.			
				Potamogeton—			
1	2	3	4	natans	.....	.....	
1				lucens	.....	.....	
1				perfoliatus	.....	.....	
1		3		crispus	.....	.....	
1				pectinatus?	.....	.....	
1		3		densus	.....	.....	

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i.	ii.	iii.	iv.		1865.	1866.	1867.
				Zannichellia—			
1		3		palustris	.....	.....	
				CYPERACEÆ.			
				Eleocharis—			
1		3		palustris	by June 18.	.....	
				Scirpus—			
		3		lacustris	.....	.....	
				Carex—			
	2			pulicaris	.....	by May 9.	
1	2	3	4	divulsa.....	by May 20.	.....	
	2	3		vulpina	.....	May 9.	
				*pendula	.....	May 8.	
1	2		4	præcox	April 26.	April 22.	
	2			pilulifera	.....	.....	
1	2	3	4	glauca	May 3.	May 5.	
1	2	3	4	sylvatica	by May 13.	May 9.	
1		3		paludosa	nearly out April 23.	April 21.	
1		3		riparia	nearly out April 23.	April 13.	
				GRAMINEÆ.			
				Phalaris—			
1				canariensis	June 16.	.....	
1		3		arundinacea.....	June 4.	not by June 28	
				Anthoxanthum—			
1	2	3	4	odoratum	nearly out April 22.	May 5.	
				Phleum—			
1	2	3	4	pratense	June 4.	June 14.	
				Alopecurus—			
1	2	3	4	pratensis	nearly out April 22.	April 30.	
1	2	3		geniculatus	June 12.	May 29.	
1	2	3		agrestis.....	May 1.	June 6.	
				Milium—			
	2	3		effusum.....	May 3.	not out May 10	
				Phragmites—			
		3		communis.....	.....	full fl. Sep. 1.	
				Agrostis—			
1				vulgaris.....	.....	.....	
1	2	3	4	alba	.....	.....	

Digitized by Google

i.	ii.	iii.	iv.		1865.	1866.	1867.
				Holcus—			
1	2	3	4	lanatus	.....	June 13.	
1	2	3	4	mollis	by May 25.	.....	
				Aira—			
1	2	3	4	cæspitosa	bud June 7.	panicles appearing June 28.	
				Trisetum—			
1		3		flavescens	June 5.	June 14.	
				Avena—			
		3		fatua	.....	.....	
1	2	3	4	pratensis	.....	.....	
1	2	3	4	pubescens.....	May 12.	.....	
				Arrhenatherum—			
1	2	3	4	avenaceum	May 29.	by June 13.	
				Koeleria—			
1	2	3	4	cristata	May 26.	about June 6.	
				Melica—			
1	2	3	4	uniflora	by May 13.	April 27.	
				Poa—			
1	2	3	4	annua	April 23.	March 3.	
1				nemoralis	April 30.	.....	
1	2	3	4	trivialis.....	by May 25.	May 8.	
1	2	3	4	pratensis	May 7.	May 6	
				Glyceria—			
1		3		aquatica	June 18.	.....	
1	2	3	4	fluitans	.....	.....	
1	2	3		plicata	June 5.	.....	
				Sclerochloa—			
1				rigida	.....	.....	
				Briza—			
1	2	3	4	media	May 22.	June 2.	
				Cynosurus—			
1	2	3	4	cristatus	June 3.	about June 6.	
				Dactylis—			
1	2	3	4	glomerata	May 8.	May 15.	
				Festuca—			
1	2	3	4	ovina.....	May 2.	May 15.	
1	2	3	4	rubra.....	by June 5.	.....	
1	2	3	4	gigantea	.....	.....	

Digitized by Google

i.	ii.	iii.	iv.		1865.	1866.	1867.
				Bromus—			
1		3		erectus	May 27.	.....	
1		3		asper.....	June 7.	.....	
1	2	3	4	sterilis	May 7.	by June 28.	
				Serrafalcus—			
1				secalinus	.....	.....	
1				racemosus.....	May 26.	.....	
1	2	3	4	commutatus.....	May 25.	.....	
1	2	3	4	mollis	May 7.	May 9.	
				Brachypodium.....			
1	2	3	4	sylvaticum	.....	.....	
				Triticum—			
1				caninum	June 12.	.....	
1	2	3	4	repens	June 9.	June 28.	
				Lolium—			
1	2	3	4	perenne.....	May 8.	May 4.	
				* italicum..... ...	by June 3.	.....	
				Barley, ear	May 19.	May 10.	
				Rye, ear	April 29.	May 15.	
				Wheat, fl.	June 7.	June 13.	
				Oats, fl.	June 12.	June 13.	
				EQUISETACEÆ.			
				Equisetum—			
1		3		arvense.....	fertile Ap. 23.	April 21.	
					barren Ap. 29.	May 13.	
1				maximum.....	.....	.....	
	2			sylvaticum	.....	.....	
1		3		limosum	June 5.	.....	
1				palustre	.....	.....	
				FILICES.			
				Polypodium—			
1	2	3	4	vulgare.....			
				Lastrea.....			
	2			Oreopteris			
1	2	3	4	Filix-mas			
1	2			dilatata.....			
				Polystichum—			
1				aculeatum			
1				angulare			
				Athyrium—			
1	2			Filix-fœmina ...			

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i.	ii.	iii.	iv.		1865.	1866.	1867.
				Asplenium—			
1	2			Adiantum-nigrum			
1	2	3		Trichomanes ...			
1		3	4	Ruta-muraria ...			
				Scolopendrium—			
1	2	3		vulgare.....			
				Ceterach—			
1		3		officinarum			
				Blechnum—			
1				boreale.....			
				Pteris—			
1	2	3		aquilina			
				Botrychium—			
1	2			Lunaria.....	April 19.	May 2.	
				Ophioglossum—			
1	2	3		vulgatum	May 2.	April 23.	

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ORNITHOLOGICAL NOTICES.

Bird.	1865. Egg.	1865. Seen.	1866. Egg.	1866. Seen.	1867. Egg.	1867. Seen
Hobby						
Kestrel	April 21.		... April 16.			
Sparrow Hawk	April 26.		... April 12.			
Long-eared Owl	June 5.		April 18.			
Short-eared Owl						
White Owl			... April 26.			
Tawny Owl	April 12.		...			
Red-backed Shrike		April 10.	May 6.			
SpottedFlycatcher	May 23.	May 19.				
Missel Thrush ...	April 8.		Mar. 28.			
Fieldfare		Nov. 10.		Oct. 31.		
Song Thrush ...	April 3.		Mar. 25.			
Redwing		Nov. 28.		Oct. 22.		
Blackbird.....	April 10.		Mar. 28.			
Ring Ouzel		April 16.	April 30.			
Hedge Sparrow	April 12.		April 4.			
Redbreast.....	April 11.		April 2.			
Redstart						
Stonechat.....			April 28.			
Whinchat.....	May 27.		May 16.			
Wheatear						
Grasshopper Warbler	May 23.		May 30.			
Sedge Warbler	May 12.		April 30.			
Reed Warbler						
Nightingale						
Blackcap						
Garden Warbler	May 26.		May 26.			
Common Whitethroat			May 11.			
LesserWhitethroat	May 13.		May 15.			
Wood Warbler...	May 26.		May 14.			
Willow Warbler	May 14.		May 15.			
Chiff-chaff						
Golden-Crested Wren.....	May 13.		April 30.			
Great Tit	April 27.		April 26.			

Digitized by Google

Bird.	1865. Egg.	1865. Seen.	1866. Egg.	1866. Seen.	1867. Egg.	1867. Seen.
Blue Tit	April 24.		April 22.			
Cole Tit						
Marsh Tit						
Long-tailed Tit	April 24.		April 22.			
Pied Wagtail ...	April 27.		April 24.			
Grey Wagtail						
Ray's Wagtail						
Tree Pipit.....	May 23.		May 16.			
Meadow Pipit...	May 13.		April 29.			
Skylark.....	April 20.		April 20.			
Wood Lark	May 5.			March 18.		
Common Bunting	June 20.		May 12.			
Black-headed Bunting	May 5.		April 30.			
Cirl Bunting.....	June 4.					
Yellow-hammer	April 17.		April 30. Sep. 23.			
Chaffinch	April 15.		April 20.			
Mountain Finch						
House Sparrow	April 17.					
Greenfinch	April 26.		May 3.			
Hawfinch	May 3.					
Goldfinch	May 29.		May 13.			
Common Linnet	April 26.		April 14.			
Lesser Redpole	May 10.					
Bullfinch	May 7.		April 28.			
Crossbill				Oct. 12.		
Starling	April 24.		April 17.			
Raven						
Carrion Crow ...	May 12.					
Hooded Crow						
Rook.....			March 19			
Jackdaw	April 11.		April 15.			
Magpie	April 8.		April 2.			
Jay	April 26.		April 18.			
Green Woodpecker						
Lesser Spotted Woodpecker						
Wryneck						
Common Creeper	April 28.		April 26.			

Digitized by Google

Bird.	1865. Egg.	1865. Seen.	1866. Egg.	1866. Seen.	1867. Egg.	1867. Seen.
Common Wren	May 3.		April 28.			
Nuthatch	April 28.		April 14.			
Cuckoo		April 8.	May 15.	April 11.		
Kingfisher		Nov. 15.		Nov. 10.		
Swallow		Mar 28 Nov 9.	June 10.	April 1. Oct. 31.		
Martin		Nov. 3.	June 11.	May 5. Nov 12.		
Sand Martin ...	May 23.		May 15.	April 30.		
Swift.....	June 9.	April 27.	May 9.	April 25.		
Night Jar.....	May 31.	May 2.				
Ring Dove	March 10		April 18.			
Stock Dove	April 11.		April 10.			
Turtle Dove.....	May 20.		May 9.			
Pheasant	May 23.		April 29.			
Partridge	May 23.		April 2.			
Common Quail						
Stone Curlew ...			March 26			
Golden Plover						
Peewit	April 20.	Dec. 19.	April 27.			
Heron				March 27.		
Common Curlew						
Common Sandpiper						
Woodcock.....				Nov. 3.		
Common Snipe ..	Nov. 12.			Ap. 17. Nov 20.		
Jack Snipe						
Landrail	May 26.	Heard Ap. 26	June 13.	Heard Ap. 26.		
Water Rail				April 8.		
Moorhen	April 13.		April 11.			
Common Coot ...	May 31.		May 4.			
Wild Duck	June 3.		March 21.			
Teal				May 3.		
Dabchick	April 29.		April 26.			
Herring Gull ...		April 23.				

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THE WEATHER.

July opened with cold wet weather, and lasted till the 7th—during this period rain fell almost all over England. From the 7th to the 12th, the temperature rose very considerably, but from that date to the end of September, it fell steadily. In July the night temperatures were high in general, so that the mean temperature of the month was not much below the average. The weather during the month was not unfavourable for the crops, though harvest operations did not begin anywhere till quite the end of the month, and only then in the extreme south districts of England.

August, as a whole, was a wet, cold month. The weather improved towards the end of the month, but for the first fortnight much rain fell, and the wind was very high. From the 15th, the days were very dull and close, with scarcely any wind, and about the 20th the weather was hot; but it soon gave way to damp, cold weather again, though the month terminated with two fine days.

The month of August may, therefore, be considered most unfavourable for agricultural pursuits; the absence of sunshine retarded the crops ripening; the frequent rain injured them, but to a less extent than was feared, in consequence of the heavy dry winds. In some places the crops were beaten down by the rain, and twisted by the wind, so that reaping machines could not be used. About Marlborough, harvesting began on the 4th.

September was a most unfavourable month for field-work. In some places rain fell every day, and though we had three days without rain, the enormous quantity of seven inches fell during the month. The wind was frequently excessively high, so that harvest-work was greatly interfered with, and much damage was done. A man was found dead on the downs from exhaustion;

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and a grey Phalarope, a very rare visitor to this country, was shot by Mr. Coleman, of East Kennett, being probably driven so far in land by the stormy weather. The account of the crops was generally very unsatisfactory—much corn, especially oats and barley, was still out quite late in the month, but the root crops were favourable. The three first days of October were very wet, but, after that date, an improvement took place, and though, during the last fortnight of the month a considerable quantity of rain fell, the days were generally fine, and consequently harvest-work was finished by the middle of the month, and less damage was done than could have been expected. In 1865, October was a very wet month, and, in that respect, October, 1866, can contrast very favourably with it, but, not having had the high winds experienced last year, the air has been damper; the days, too, have frequently been very dull, and the sun has not been quite so powerful.

The first week of November was warm (so much as 11° warmer than in 1865), but the temperature fell gradually till on the 17th, a very cold period set in—this lasted only for four days, and the month ended with cold weather, but not colder than in 1865. On the 15th and 16th, the barometer fell very rapidly, but as rapidly regained its former level. High winds and rain occurred during that interval. The month, as a whole, was damp, and the weather rough.

The temperature of December rapidly increased for the first two days, and has continued much above the average. A considerable quantity of rain has, however, fallen, and fogs prevailed in the early part of the month. The height of the barometer has been very variable, whereas last year for the first fortnight it was remarkably high. Both in November and December, the minimum temperature at night has been very variable—in both months it was very cold from the 7th to the 13th.

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	Mean height of Barometer.		Monthly range.		Mean temperature of air.		Mean daily range.		Maximum in shade.		Minimum in shade.		Maximum in sun.		Minimum on Grass.		Mean degree of Humidity		Mean amount of Cloud.		Amount of Rain.		No. of days on which it fell.	
	1866	1865	1866	1865	1866	1865	1866	1865	1866	1865	1866	1865	1866	1865	1866	1865	1866	1865	1866	1865	1866	1865	1866	1865
	in	in	in	in	°	°	°	°	°	°	°	°	°	°	°	°					in	in		
JULY	29·483	29·500	0·976	0·652	59·4	62·0	18·2	22·2	83.2	82·1	40.3	41·4	139·8	145·1	31·2	34·2	76.1	87·4	6·8	6·8	1·574	2·561	12	16
AUGUST ...	29·349	29·415	0·736	0·856	57·5	58.5	17·0	19·8	74.6	76·6	38·7	40·2	136.0	140·7	30·0	32·8	76.8	80·5	7·5	7.0	3·069	3·968	21	19
SEPT.	29·262	29·772	0·852	0·562	54·1	61·7	12·3	24·1	70·7	82·5	37·1	35·2	119·3	141·0	27·0	29·5	90.4	77·0	8·3	5·0	7·068	0·188	29	3
OCTOBER	29·625	29·139	0·810	1·218	51.0	50·4	11·8	17·5	67·6	72.6	30·2	31·0	119·0	117·2	24·0	23.7	89.0	82·7	7·9	6·6	1·793	7·311	16	23
NOVEMBER	29·498	29·400	1·022	1·522	44·0	43·5	13·6	16·0	57·9	65·5	25·6	24·4	97·8	89.0	18·8	19.2	87.2	88·0	7·1	7·0	3·102	3·893	18	20
DECEMBER	29·482	29·729	1·210	1·582	42·6	42·0	11·6	10·5	56·3	56.6	23·1	24·3	76·0	76·1	20·0	18·4	90.4	92·0	7·6	8·3	3·312	2·463	23	15
MEAN.....	29·448	29·493	0·934	1.065	51·4	53·0	14·1	18·4	...	...	...	...	...	...	...	...	85·0	84·6	7.5	6·8	...	...	...	...

Total amount of rain during the six months in 1866—19·918 inches; in 1865, 20·884 inches.

Total amount of rain during the year 1866—38·052 inches; in 1865, 34·229 inches.

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LIST OF LIBRARY.

No. of Vols.	Name of Book.	Donor.
5.	Intellectual Observer (1862-1866)	The Rev. J. M. Fuller.
5.	Popular Science Review (1862-1866) ...	,,
3.	Recreative Science	,,
1.	Flora of Marlborough	The Rev. T. A. Preston.
3.	The Entomologist	,,
2.	The Entomologist's Monthly Magazine ...	,,
2.	The Ibis	,,
6.	The Geological Magazine	The Rev. T. Cornthwaite.
1.	Ootheca Woolleiana (Part 1)	Professor Newton.
1.	Memoir of J. Woolley	,,
1.	Cassell's Birds	A. Herklots.
3.	Synopsis Floræ Helveticæ	Rev. H. Baber.
1.	Flora Germanica	,,
1.	British Algæ	Mrs. Gray.
1.	Wood's Index Entomologicus	Purchased out of Society's Funds.
1.	Handbook of Geological Terms (Page) ...	,,
2.	Hewitson's Eggs	,,
23.	The Zoologist	,,
1.	Sowerby's Wild Flowers	,,

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REPORTS.

MIDSUMMER, 1865.

No. in hand	5	Sold	2
		Given away	2
		In hand	1
	5		5

CHRISTMAS, 1865.

No. in hand	145	Sold	16
		Given away	2
		In hand	127
	145		145

MIDSUMMER, 1866.

No. printed	400	Supplied to Members	31
		Sold	238
		Given away	18
		In hand	113
	400		400

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ACCOUNTS.

Received.	£	s.	d.	Spent.	£	s.	d.
Balance from June, 1866	14	3	0	Entomological Cabinet	20	0	0
Subscriptions from Members	4	14	6	Lights	0	9	0
Donations	12	18	0	Books for Library	9	6	0
Sale of 1st "Report"	0	2	0	Stationery, &c.	0	8	9
Sale of 2nd "Report"	0	16	0	In hand	20	6	9
Sale of 3rd "Report"	17	17	0				
	£50	10	6		£50	10	6

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LIST OF DONATIONS.

	£	s.	d.
Right Hon. Sir D. Dundas, M.P.	5	0	0
H. B. Reynardson, Esq.	1	0	0
Miss E. Reynardson	1	0	0
F. E. Thompson, Esq.	1	0	0
W. W. Dayman	0	15	0
Mr. C. Stubbs	0	10	6
A. C. Almack	0	10	0
H. A. Evans	0	10	0
J. W. Mills	0	10	0
G. K. Mills	0	10	0
Rev. T. A. Preston	0	7	6
Rev. J. J. Pulleine	0	7	6
W. Almack	0	5	0
A. Armstrong, Esq.	0	2	6
W. R. Carles	0	2	6
W. W. Fowler	0	2	6
S. Hammick	0	2	6
W. P. Henderson	0	2	6
	£12	18	0

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REPORT

OF THE

MARLBOROUGH COLLEGE

Natural History Society,

FOR THE

HALF-YEAR,

ENDING MIDSUMMER, 1867

"Tum mihi Naturæ libeat perdiscere mores
Quis Deus hanc mundi temperet arte domum.

MARLBOROUGH
Printed by C. Perkins, Times Office
1867

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PREFACE.

In taking a general review of the Natural History Society during the past half-year, there is one point which before all others demands notice. It is, that while certain members among the Prefects and others high in the School are gradually moving from among us, their place in the Society is *not* being supplied by others of equal or similar standing.

This is a fact which deserves the serious consideration of the School. It would be very much to be deplored if it should mean a decay of vitality and interest in natural history studies. It would be a much more deplorable thing if it should be a symptom of narrow intolerance felt or displayed against those who pursue, or wish to pursue, such studies. The case stands thus. As lately as two years ago the Society's best friends could say no more than that it was feeling its way; they might invite help and co-operation, pointing out certain probable advantages to those who might be able to co-operate, but they could do little more. Things are now far otherwise. With its growing Museum and Library, its sections, the lectures given in connexion with it, and improved opportunities for rendering the meetings practically useful, the Society is an addition to our resources which we shall certainly be very unwise to underrate or to neglect. It can now offer actual and positive advantages to anyone who by active membership chooses to make use of them. Nor need membership involve any alarming sacrifice of time. A little method and arrangement will enable anyone, however actively occupied in other ways, to learn something worth learning, and to help others who are wishing to make way in the same pursuits. Probably there is no public school in England that would not cordially welcome the transplantation into itself, were such a thing possible, of our existing means for the study of Natural History.

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We repeat a sincere hope that the Upper Forms may take these remarks into consideration. It is in the interest of the School, not of the Society, that they are made. The Society neither has, nor can have, any separate interests of its own.

To pass to other matters, our best thanks are due to several kind donors. To Mrs. Gray we are indebted for valuable gifts of sea-weeds and ferns; to E. im Thurn for very numerous gifts of birds; to Mr. Gauntlett for the munificent present of a very fine Golden Eagle; and to Rev. H. E. Booth, Mr. H. A. Evans, Mr. W. W. Fowler, and various former members, for donations of books to the Library. Both Museum and Library are progressing favourably. A detailed report of the Museum will be found elsewhere. It must be remarked, however, that everything that has been done in this department has been the work of individual liberality.

The staple of the papers read before the Society during last half-year, and perhaps the attendance at the meetings (excepting certain special occasions), have shown tokens of weakness traceable to the cause pointed out above. If Members of the Upper Forms do not recruit the Society, it is idle to expect any very promising papers, either in the shape of original work or of useful compilation. It may be added that those who in past days have undertaken such work have often found it excellent practice and training to do so.

With these few words the Report may be left to speak for itself. It will be found to show traces of the same unwearied and unstinting care which watched over the formation of the Society, and without which it never could have become what it is.

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LIST OF MEMBERS.

PRESIDENT.

* Rev. T. A. Preston.

SECRETARY.

W. R. Carles.

TREASURER.

T. R. Dumergue.

LIBRARIAN.

R. F. Isaacson.

COMMITTEE.

The Ex-officio Members. R. F. Isaacson.

* T. R. Dumergue. * G. H. Dawson.

EDITING COMMITTEE.

Rev. T. A. Preston.

W. R. Carles. R. F. Isaacson.

HONORARY MEMBERS.

The Rev. the Master.
A. Armstrong, Esq.
H. M. Moule, Esq.
W. E. Mullins, Esq.
F. E. Thompson, Esq.
C. M. Bull, Esq.
Rev. J. J. Pulleine.
Rev. J. F. Bright.
Rev. J. Sowerby.
Rev. H. C. G. Moule.
Rev. H. Bell.

MEMBERS.

R. B. Mainwaring.
J. W. Parrington.
T. E. Maclean.
W. E. Bolland.
A. Herklots.
E. H. Carr.
A. P. Hockin.
J. H. Johnson
* F. J. H. Jenkinson.
A. C. Hilton.
J. E. Hilliard.
* W. D. Smith.
H. M. Hilton.
E. im Thurn.
E. Almack.
A. M. Hardy
H. G. Baily.
J. C. Palmer.
F. W. Head.
J. B. Oakeley.
E. Maitland.
H. A'Court.
P. G. Young.
G. F. Ruck.

* Heads of Sections.

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RULES.

1.—That this Society be called the Marlborough College Natural History Society.

Constitution.

2.—That the Society consist of Members and Honorary Members.

Officers.

3.—That the Officers of the Society consist of a President, Secretary, Treasurer, and Librarian, to be elected from and by Members of the Society.

Management.

4.—That the affairs of the Society be conducted by a Committee, consisting of the President, Secretary, and three other members of the Society, to be elected from and by Members of the Society: three of whom shall form a Quorum.

President.

5.—That in case of an equality of votes, the President shall have a double or casting vote.

6.—That in the absence of the President, the Committee be empowered to request any member of the Society to take the chair.

Committee.

7.—That on the occurrence of any election, each member of the Committee have double the number of votes of any other Member of the Society.

8.—That two Members be appointed half-yearly by the Society, to assist the Secretary in Editing the Report.

Secretary.

9.—That the duties of the Secretary be to keep a list of all the Members of the Society, and of all former Members and Benefactors who may wish to receive the Reports of the Society; to summon meetings (when necessary) of the Society; to keep a detailed report of the proceedings, as well as lists of Members and Visitors present at each meeting, and generally to act under the direction of the Committee in all matters connected with the welfare of the Society.

10.—That in the absence of the Secretary from any meeting of the Society, minutes of the proceedings be taken by a member of the Committee, appointed by the President.

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Treasurer.

11.—That the duties of the Treasurer be to collect all sums of money due to the Society; to receive all donations of money; and to disburse all sums payable by the Society out of the funds entrusted to him.

12.—That the Treasurer furnish half-yearly a detailed account of the receipts and disbursements to be audited by the Committee.

13.—That the funds of the Society be placed in the College Bank, and that no money be withdrawn by the Treasurer without the signature of the President to the order; or in his absence, that of the Secretary.

Librarian.

14.—That the duties of the Librarian be to keep a catalogue of the Library, with the names of the Donors; to see that the Library Regulations are carried into effect; to be responsible for the order of the Museum, and when necessary to assist the Secretary in the distribution of the Reports of the Society.

Library.

15.—That any Member of the Society be at liberty to consult any of the books belonging to the Society, but that only certain volumes, to be decided on by the Committee, be allowed to be taken from the room.

16.—That if any Member wishes to take a volume from the Museum, he shall give his name, and the name of the book, to the Librarian, who shall enter them in the book kept for the purpose.

17.—That every volume so taken out be returned by the end of the quarter, but that no book be kept more than one month.

18.—That if any volume be damaged, such damage shall be reported by the Librarian to the Committee, who shall decide upon any further proceeding in the matter.

Museum.

19.—That any Member of a section, who is not a Member of the Society, be allowed access to the Museum at such times as it is open to Members of the Society generally, provided he first obtain leave from the President, which leave shall be renewed every quarter, but may be taken away at any time, if the privileges be abused in any manner.

20.—That the same privileges be extended, under the same conditions, to such other Members of the School who may wish to use the Library and Collections for the purposes of study, provided there be a reasonable excuse for their not belonging to a section.

21.—That in all cases the Museum be used for the study of Natural History alone, and not as an ordinary Reading Room.

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Members.

22.—That the election of new Members rest entirely with the Committee.

23.—That every Member pay a half-yearly subscription of 2*s.* 6*d.*, to be paid at the first meeting of the Society in that half-year.

24.—That if a Member be elected at, or after the Quarter, he shall only pay 1*s.* on Election.

25.—That Members have the right to be present, to state their opinions, and to vote at all general meetings of the Society; to introduce a visitor at general meetings of the Society; to have personal access to, and to introduce a visitor to the Museum; and to have a copy of the Report half-yearly.

Visitors.

26.—That on such occasions when the number of those who wish to be present as visitors at the general meetings of the Society is greater than the number of members who attend, the President and Committee shall be empowered to admit two or more each, as shall seem fit.

Honorary Members.

27.—That Honorary Members have all the privileges of Members, except the power of introducing a member of the School to the meetings of the Society.

Suspension of Members.

28.—That any Member be liable to be excluded from the Society by the Committee, if, in their opinion, he shall have failed to show sufficient energy in the working of the Society.

Sections.

29.—That sections be formed for the more accurate study of the different branches of Natural History, and that the Heads of these sections be chosen by the Committee half-yearly from Members of the Society.

30.—That these sections shall hold meetings as often as shall seem fit to the Heads of the several sections, at which any member of the School, with the sanction of the Head of that section may attend.

Meetings.

31.—That ordinary meetings of the Society be held once a fortnight, but that the Secretary be empowered to call extraordinary meetings when necessary.

New Rules.

32.—That any Member of the Society have power to propose any new rule or any alteration in an old one, provided the motion be seconded by another Member.

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MEETING HELD FEBRUARY 15TH, 1867.

Ornithology.

G. H. DAWSON exhibited a Lapwing, which he presented to the Society.

E. IM THURN exhibited a Thrush's nest, containing the young birds stuffed, and also a Heron.

THE PRESIDENT then explained the theory of Dr. Baldanus, relative to the colouring of Cuckoo's eggs.

Entomology.

F. J. H. JENKINSON mentioned a few captures which had been already made: *Vanessa urticæ, Gonepteryx Rhamni, Hibernia Rupicapraria.*

Botany.

THE PRESIDENT read a list of the more important notices.

Archæology.

E. ALMACK exhibited some coins, a farthing of the reign of Queen Anne, shillings of Elizabeth, James I, Charles I, Edward VI, &c.

J. W. PARRINGTON exhibited some Roman and Saxon remains from the Sussex Downs, among them a spear-head made from the bone of a horse's leg, a bottle for the ashes of the heart, a bottle for tears, a granite celt, &c.

H. M. HILTON then read a paper on BEARS.

G. H. Dawson was elected a Member of the Committee, in place of C. A. Harrison.

There were 43 persons present.

MEETING HELD MARCH 1ST, 1867.

Ornithology.

G. H. DAWSON mentioned notices of the Woodcock (seen February 23rd) and Brambling (March 1st) and exhibited a Kingfisher, which he presented to the Society.

E. IM THURN exhibited a Wren's nest, built this year, but deserted on Feb. 23rd (known by the name of a cock's nest), and specimens of the four species of British Woodpecker.

A. HERKLOTS exhibited a specimen of the Tree Creeper.

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J. W. PARRINGTON exhibited a Stormy Petrel, which he presented to the Society.

Entomology.

F. J. H. JENKINSON read a short list of captures made during the past fortnight.

Botany.

THE PRESIDENT exhibited all the plants as yet found in flower (upwards of 30 in number), several of which were a month before their usual time.

Zoology.

A. C. HILTON exhibited a mummified cat.

Mineralogy.

H. M. HILTON exhibited a fine specimen of Iron Pyrites.

Geology.

W. D. SMITH exhibited a very fine specimen of *Cardita planicosta*, found at Fyfield.

THE PRESIDENT mentioned that Sergeant Haggis had presented to the Society a matchlock, which he had taken from the Sikhs.

T. R. DUMERGUE then read the following paper on

PRESHUTE AND ITS ANTIQUITIES.

After considerable hesitation, I have fixed upon Preshute for the subject of my paper, my reasons being (i) that it is desirable to read upon some subject with which we are all connected, and of which we all know enough beforehand to appreciate any additional information which may be given upon it; (ii) that the subject about which we should be *most* interested, and with which we are *most* connected, has already been written upon, and Dr. Cotton's lecture on the Antiquities of Marlborough College is accessible to us all, and those of us who have not yet read it will, if they do so, I am sure, find themselves well repaid for their trouble. I have attempted, therefore, to write upon a subject bordering indeed upon, but not identical with the subject last named. I hope I shall not appear to be intruding too far upon another person's ground if I happen to relate here and there some of the same facts which are to be found related in Dr. Cotton's lecture; such an intrusion could hardly be avoided by anyone who has to write an archæological paper upon this district.

We are all of us, as I have already said, most closely connected with Preshute, so long as we remain in Marlborough College. We go to Chapel, we have our meals, we play cricket and football, we bathe, not in Marlborough but in Preshute, and one half of our number sleeps in Preshute every night. The College therefore might just as well be called Preshute College as Marlborough College as far as its site is concerned.

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If you wish to know the limits of Preshute you must imagine a line drawn from the "lower ground" in the cricket field to the left-hand pipe which conveys the water from the roof in front of the Old House. Continue this line to the river, and let it run along the river to the E. end of the town. All the land immediately on the W. and S. of this line is in Preshute; the Railway Station and St. Margaret's are in Preshute, not in Marlborough. On the N. of Marlborough Preshute extends as far eastward as Mildenhall, and as far northwards as Ogbourne St. Andrew. It also extends as far W. as Fifield, and as far S. as Clench Common, which district it formerly included. It was once the largest Parish in Wiltshire. In area it is several times larger than the two combined parishes of Marlborough, but in importance it is of course utterly inferior to them. Marlborough probably once formed a part of Preshute, or rather what is now Marlborough was once Preshute, but as the former place gradually increased it formed itself into two distinct parishes; it cut for itself a hole, so to speak, in its neighbour's property, and there it has planted itself, and has grown so much in size and importance as to have long since ceased to be the rival of its unaspiring neighbour.

The origin of the town of Marlborough was due to the following causes. That which we now call the College Mound was in all probability raised, like Silbury Hill, by the so-called Druids, but soon after the Conquest it formed the foundation of the keep of a Castle, for which purpose it was admirably adapted. The name of this Castle was "Merleberg," which some persons suppose to mean the *hill* or *castle of Merlin* (Merlin was a British hero, and to him has been ascribed the building of Stonehenge); others take the first syllable to mean "marble" (a name given in consequence to the number of sarsen stones or grey wethers in this neighbourhood); others take Marl to mean the mineral substance which goes by that name, in consequence of the chalk formation of the district. It was usual in those times of warfare and oppression for the poorer inhabitants to resort to the neighbourhood of the castles of the rich, partly because they were their serfs, and were required to be near them in order to work on their estates, partly that they might obtain protection against marauders. In this way the town of Marlborough was originated.

I shall now attempt to put before you the history of Preshute as well as I can.

A few years ago there were no less than three substantial monuments of the Druids in this parish. One of these, no longer existing, was a cromlech which used to stand on the downs not far from Rockley; it was blown up (as I learnt one day when I had gone in search of it) by a farmer, because it got in the way of his plough. The other two still remain; one is the Cromlech or Kistvaen in Clatford bottom, commonly nick-named the "Devil's Den," which

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is supposed to have borne some connection with the temple of Abury, which is not far distant, and which was erected either for sacrificial or for sepulchral purposes. Its form you all know, so it is needless for me to describe it. The third of these monuments is that object of which we may all feel proud, as it stands within our College grounds. The Mound is, as I have already said, supposed to have been erected by Druids; it must at all events have been standing long before the castle was built upon it, as it could not have supported it had it been otherwise. This mound perhaps had some connection with Silbury hill, both of these being on the banks of the Kennett, and both of nearly the same immense size. The whole neighbourhood indeed abounds with the monuments of early Britons, in the form of tumuli.

Passing on from early times to the period of the Romans in Britain, we have two specimens at least of Roman work in this parish. One is the Bath Road, for the present road for the most part follows the same track as the old Roman road from London to Bath; that part of it, however, which passes by our gates is not Roman; the original road at this point was much more direct than the present one, and passed close in front of the present Old House. The other piece of Roman work to which I allude is a small rectangular camp, situated at the extreme S. of the Common; you pass it on your right as soon as you leave Kingsbury street on your way to Rockley. There has been much dispute as to the claims which this enclosure may lay to antiquity; several persons think that it is only a work of modern times. It may, however, have been used as a small out-post of the neighbouring station, Cunetio. This station, I may observe, is mentioned in the account of Antonine's march from Bath to London, as having been chosen by him as a halting place. The opinion of antiquarians once was that the Castle Inn, *alias* Marlborough College, was the site of this ancient station, but it has now been found to be far more probable that Cunetio stood where Mildenhall now stands, or else about a mile S. of Mildenhall, at a place called Folly Farm.

The only monument of the Saxons in this locality I believe to be the Wansdyke *(Woden's Dyke)*, which you may see in the West Woods, and again close by the fir-trees on the way to Martinsell. This enormous work seems to have been raised to mark the division between the two kingdoms of Mercia and Wessex. It seems to have extended from the Thames to the Severn, thus dividing the island into two portions. You may see it in great perfection if you choose to go to St. Ann's Hill, where the rampart cannot be less than 20 feet high, and the moat is of about an equal depth. Some persons believe this to have existed even before the Roman period, because at Morgan's Hill, the Roman road meets it, and even runs in the moat for some distance.

I shall now pass on to the Norman period. We do not know the date of the foundation of the Castle, nor yet the name of the founder. We do know,

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however, that William the Conqueror imprisoned Agelricus, Bishop of South-sex or Sussex, within it; as early therefore as William I.'s time Preshute may have received its Norman name, which is derived most likely from *Près-de-Château*—"near the Castle," or *Prés-de-Château*—"the meadows of the Castle." A most unlikely and absurd derivation has been given by one who imagined the name Prestcut, as it was once spelt, to be a corruption of Priest's cote. Stukeley was of opinion that the name had been given in consequence of the low meadows in which the Church stands, but this explanation seems too vague, and I have not been able to understand what the connection is between "Preshute" and "low meadows." The two first explanations seem to be by far the most satisfactory, for what could be more natural than that the land immediately surrounding the Castle should receive its name from it.

Having said thus much upon the name of Preshute, I shall now pass on to the history of the place. The Doomsday Book does not tell us directly in whose keeping Marlborough Castle was, at the time in which the book was compiled, but Manton or Preshute was held, as that book informs us, by a man named Miles Crispin, who also held Ogbourne.

The next notice that we have of Marlborough Castle is that Henry I. held his court there at Easter, 1110. During his reign a priory was built at Clatford, which is in Preshute parish, and lies between Manton and Fifield. The founder is a certain Ralph de Mortimer, and the priory was built in connection with the abbey of St. Victor en Caux, in Normandy. On the site of the priory there is now a large farm-house. We are told that in the reign of Henry IV. a man named Woodford, of Marlborough, was convicted of having stolen a stone, of the value of 40d., which had been placed in front of the high altar of this priory.

After Henry I.'s death, not only Marlborough, but almost the whole county became the scene of the contest for the crown between Stephen de Blois and Henry I.'s daughter, Matilda. During this period the castle was held by John Fitz-Gilbert, a robber chieftain, who is accused by a contemporary historian of having been guilty of every kind of crime. He was one of Matilda's supporters, and he showed his boldness and ferocity by hanging the keeper of Devizes Castle, who was devoted to Stephen, upon gallows which he erected before his victims castle walls. I must not, however, say too much about Marlborough Castle, for you had better read Dr. Cotton's lecture if you wish for information about that. But I cannot well avoid saying a few words with reference to it as I proceed, for, as is most natural, the history of the Castle forms so important an element in the history of Preshute.

We have but few notices of this neighbourhood in Henry II.'s reign. A preceptory was built at this period on the site of the present house at Rockley by some Knights Templars. Henry II. granted the Castle, soon after his

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accession, to his son John, who often came to Marlborough. We read the following interesting fact connected with Preshute from the rolls: "The King to all men greeting. Know that by divine intuition, and for the safety of our soul and the souls of our predecessors and successors, we have given unto Eve, the recluse of Preshute, the sum of one denarium *(penny)* per diem, which she shall enjoy in free gift so long as she lives, to be doled to her by the hands of the constable of Marlborough Castle. Dated at Ludgershall, 4 Aug. 1215." This I believe to be the oldest notice of anything of a religious nature in Preshute itself, though religious houses had already, as we have seen, been erected in the neighbourhood. Yet there must have been a Church at Preshute even at this time, and I will tell you by and bye my reasons for making this conclusion. Soon after king John's reign, at all events, and perhaps during his reign, Preshute possessed, if not a church, at least a chapel. The Chapel of St. Nicholas was situated in the Castle ground, close under the mound; its exact site is unknown. It is mentioned as a fabric as early as 1249, but the first institution to it is dated 1311. It was called the "Free Chapel" of St. Nicholas. This institution may well afford special interest to anyone connected with Preshute, for it was within its walls, in all probability, that the fine old font now in Preshute Church stood when some King John's children were baptised at it. Some persons believe that King John himself was baptised at it, but we do not know for certain whether the Chapel had been built until after his death; yet it is possible that even if it had not been built until 1249, the font may have existed in the Norman church of Preshute. I have put before you a sketch of this font; you may see the object itself just inside the door of Preshute Church. There have been many different opinions as to the material of which it is composed. It certainly *appears* to be black marble, but some persons say that it is touchstone, others black agate, others dark grey marble, others slate. Not many years ago it was taken to Devizes to be repaired, for it had been very much broken; the general belief as to its material was I believe that it was of black marble. Some persons consider it to be a Norman work, but an examination of any Norman font, such as that at Winchester or at Avebury, will immediately show how unlikely this is. It may have come from the continent.

Let us once more follow the history of the place. Henry III often used to visit Marlborough. In his reign several additions and improvements were made to the Castle. Most of you must have seen a moderately large, gabled house, very old and very picturesque, on your way to or from Marlborough Railway Station. It is the last house which you pass, on your right hand after crossing the bridge at the further end of the town, before you reach the Station. This was formerly a flourishing Priory of White Canons of the Sempringham Order, dedicated to St. Margaret. Henry III. is mentioned as

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having given to it all the land in La Berton (*Barton*). The monks who lived here seem to have been very well-to-do, as they derived a good revenue from almost all the principal parishes in the neighbourhood. To this institution Richard II. annexed a hospital dedicated to Thomas à Becket, which had been built in Henry III.'s reign. It was established for the maintenance of a master and several poor sick brethren. At the time of the suppression of the monasteries by Henry VIII., St. Margaret's became a private house. We are told that soon after it had become so "One Master Daniel" lived there, and while it was in his possession it became celebrated by the death of James I.'s Prime Minister, Sir Robert Cecil, which is said to have taken place there A.D. 1612. This man had been created Viscount Cranborne and Earl of Salisbury, and though he was a prudent member of James I.'s Council, yet he was not without the same mistaken ideas which Strafford showed with respect to the unlimited power of the king's prerogative.

From the time of Henry III, the Castle began to assume more of the appearance of a country mansion than it had done previously. It remained in possession of the Crown until Henry VIII's reign, when it was changed into a manor house. Leland informs us, writing in 1538, that "By the Chief Parish Church dedicate to St. Peter, there is the ruin of a great Castle, hard by the West-end of the town, whereof the Donjon tower partly yet standeth." The Castle passed from Catherine Parr through her second husband to her husband's brother, Edward, Duke of Somerset, the Protector during Edward VI's minority, and the son of Sir John Seymour, whose handsome tomb you may see at Great Bedwyn. The family of the Seymours', some of whom bore the title of Duke of Somerset, others that of Earl of Hertford, continued in possession of the Old House till the middle of the 18th Century, at the end of which period it became an Inn, and in 1843 it was transformed into Marlborough College.

The Castle must have been dismantled early in the 16th Century, for there are no institutions of the Chapel of St. Nicholas bearing a later date than 1517. The present building—the Old House—was built by Francis Lord Seymour, the great grandson of the protector Somerset, and was designed, it is said, by Inigo Jones. The parish register of Preshute records the death of some of the workmen who were accidentally killed while building it.

Now that I have touched upon the subject of the Preshute registers, I may as well observe that the earliest of them extant is dated 1607, and that in that same century a record is made of the baptisms of three of the Seymour family, two of whom became Dukes of Somerset, being sons of Charles, second Lord Trowbridge, and grandsons of the builder of C. House. One of them was Francis, who was murdered in Italy, the other was Charles, who, by succeeding his brother in the title became the sixth duke. The

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character of the latter brought upon him the name of the "Proud Duke of Somerset." In the next century two sons of Francis Seymour were interred at Preshute.

I have not time, I fear, to give an account of the two sieges of Marlborough which took place soon after the Civil War; all this neighbourhood was, of course, affected by them.

There are a few miscellaneous pieces of information which I should like to give, with respect to Preshute.

First, I shall try to put before you the meaning of the word *Barton*, which is the name of the district to the N.W. of Marlborough, after which the new Masters' houses and Mr. Lyne's farm are named. One opinion is that Barton means a court-yard or enclosure near a manor, being derived from the Saxon *beretun*, *bere* meaning 'barley' and *tun* an 'enclosure, 'Rick-barton' being a synonym for 'Rick-yard;' thus the name would naturally date from a time a manor has existed in the neighbourhood: that this manor cannot have been the present Old House is evident from the name la Berton being applied to this locality so early as Henry III's reign; I have not had access to the copy of the Doomsday Book or to any early MSS. which would give a list of all the manors in this district in early times, otherwise I might have been able to speak with more certainty on this point.

I cannot myself therefore but incline to the other opinion on the subject, namely, that *bar* means the 'bar gate' of the castle, and *town* is used with the Scotch signification and means 'a farm enclosure;' if this latter be the correct explanation, Barton is one of the few names still in existence which remind us of the Castle, the other names which do so being Preshute, Merleberg (or Marlborough), and a third, which I have not yet mentioned, but which was given to a quarter of the town in later times, Bailey Ward.

The meaning of the word Manton I have not quite discovered; it occurs in the Doomsday Book.

In the village bearing this name are preserved two specimens of the carriage which was used 150 years ago. One is a four-wheeled carriage, the other a phaeton; both appear to have been very handsome in their day. They were built for one of the Baskerville family on his becoming high sheriff of Wilts, and they bear his coat of arms upon their panels. The Baskervilles are of royal blood; they claim descent, as Mr. Waylen informs us, from several kings of Western Europe, and even from Charlemagne himself. They formerly lived at Rockley, and their names appear several times in the Preshute parish registers.

In the vestry of the church there is a hatchment probably belonging to one of the Beach family, which was one of the leading families in this district in former times, and of which no trace remains here at present. There is also

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a monument recording the deaths of two members of Parliament, a father and a son, named Daniel. This name occurs on the Roll of Battle Abbey as borne by one of the companions in arms of William the Conqueror. This particular branch of the family bought St. Margaret's priory soon after the suppression of religious houses by Henry VIII. The benefice of Preshute in early times was of great value, nor is it inconsiderable at the present time, but the great tithes are appropriated by the lay vicars of Salisbury, and the Vicar of Preshute receives his tithes from Clatford only. The Chapel of St. Nicholas was originally in the gift of the Vicar of Preshute, but afterwards it was, as the Church of Preshute now is, in the gift of the Bishop of Salisbury. A M.S. dated 1291, gives us the following information:—"Ecclesia de Prescut cum Capella, taxatio £20, decima £2." Preshute Vicarage was burnt down during the last century, and has never been rebuilt. It used to stand at the top of the churchyard, on the side of the pathway to Manton, opposite the present Preshute House. Its site is still marked by some elm-trees, which, together with the hedge which bounds the field by the churchyard, enclose a rectangular space, which was formerly the vicarage garden. Dr. Stukely mentions in his Itinerarium that in his time the church contained a piece of glass in one of the windows upon which was inscribed, DNS. RICHARDUS HIC VICARIUS, who he believed, "lived formerly in a little house at Marlboro' over against the castle [inn], now an ale-house, where his name is cut in the same old letters over the door." It seems, therefore, that either the "Mount Inn" or the "Coach and Horses" was formerly used as Preshute Parsonage.

Whether it is really true that Thompson the poet composed his "Spring" at Preshute I cannot say; a stone at any rate used to be pointed out not long ago upon Granham Hill, upon which, it is said, he used to sit while he meditated upon his verses.

The rest of my paper will be devoted to a short account of the church. The nave, aisles, and chancel were rebuilt in 1853, much after the model of the old building; the pillars in the interior are Norman, with the exception of the semi-pillar attached to the eastern wall of the south aisle, which, though it bears a Norman moulding, is of modern construction. These pillars were taken down at the restoration of the Church, were scraped and cleaned, and then put together in the same state as they had been previously. I must take it for granted that you are all aware how in England the Norman style is the earliest style of church-building, of which this country possesses any variety of specimens, and how this style passed gradually away, and was followed by the Early English style; how that then, after a transition, came the Decorated; another transition then followed, and lastly the perpendicular style was used. When you know this you can readily understand, I think,

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what I have to say with regard to the construction of the Church. That there was once a Norman Church at Preshute seems certain, for before the restoration in 1853 there was a low Norman arch separating the chancel from the nave; and besides this a piece of Norman carving was found upon the inner flat surface of a semicircular block of stone which had been used in the construction of one of the Norman pillars; another proof appears in the existence of these pillars themselves, which are genuine Norman, and (with one exception) are not merely modern imitations.

The remainder of the older part of the Church was built, as we judge from the peculiarities of its architecture, during the transition from the Decorated to the Perpendicular style, *i.e.*, in Edward III.'s or Richard II's reign. The chief proofs of this are the west window (in the tower) and the east window of the chancel, which, though new, is an exact representation of the old east window. The former of these, from the rudeness of its construction, gives evidence of having been built before that style had been quite understood by the builders; the latter is an example of the florid or flowing tracery (peculiar to the Decorated style), in which there is a slight tendency towards the Perpendicular, some parts of the tracery being a little elongated, forming almost straight vertical lines, which is the main characteristic of the Perpendicular style. The architect who restored the Church has, I think, very successfully shown the transition from the one to the other style in the three smaller windows of the S. aisle.

The tower is a specimen of the Early Perpendicular style also; on either side of the western window there is a small shield bearing some of the usual emblems of our Lord.

I may remark that the pews are all made out of the oak fittings of Malmsbury Abbey. There is one brass in the Church, dated 1518, from which I have taken the rubbing which you see. The inscription is—

pray for the soules of iohn Bailey & maryon his wyf, whiche iohn deceffed the ix day of may the yere of our lord god mcccccxviii on whose soules ihu habe mercy.

It represents the venerable John Bailey and his wife Marion, beneath the former are arranged their three daughters and beneath the latter their seven sons, all of them being in an attitude of deep devotion, each standing in exactly the same posture as those on either side, as though the drilling of the 16th century was as perfect as the Egyptian and Assyrian sculptures represent that of the ancients to have been.

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In the porch there is preserved a very elegant piscina in the form of a flower, four shallow circular bowls forming the four petals, with a sort of finial in the centre, and each bowl has its own drain.

The piscina is now built vertically into the wall of the porch, outside the church door. There are one or two fragments of ancient carving preserved in different parts of the church, of which one is a quatrefoil, under the east window, another is a representation probably of some saint holding a sword in his hand, perhaps St. Paul; it is just possible however that it may be intended to represent St. George, the patron saint of the Church, though that is not likely.

The one object, however, of which Preshute Church may well be proud, is the font, which, though exceedingly interesting from its history and associations, is not the less so on account of its merits, its great age, its large size, and its imposing form.

I have now said all that I have thought necessary upon this subject. Let me only add that whatever information I may have given about the castle I have not borrowed from the lecture delivered by Dr. Cotton, for that would hardly have been right, but I have gone one step farther back, and whatever I have thought necessary to say upon this subject with reference to the castle I have derived from Waylen's History of Marlborough. I am indebted to the Vicar of Preshute also for much of my information upon the subject.

You see that there is nothing in Preshute which can make it *famous*; it has indeed some few interesting associations, but its greatness is still yet to come, and let us hope that it is wrapped up in the future, not only of Preshute House, but also of that institution to which Preshute House belongs —our School.

W. D. Smith was elected head of the Geological Section: and C. M. Bull, Esq., and Rev. H. Bell, Honorary Members.

There were 46 persons present.

MEETING HELD MARCH 15TH, 1867.

Ornithology.

The President presented to the Society a Pintail Duck, a Ruff, and Reeve.

E. im Thurn presented a pair of Partridges.

Archæology.

T. R. Dumergue exhibited some coins, among which were a coin of the reign of Shanghai, a denarius of Trajan, and Constantine.

The President exhibited a scent bottle taken from an Etruscan tomb.

Geology.

A perfect collection of crag fossils, presented to the Society by the Rev. F. W. F. Farrar, F.R.S., was passed round.

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E. ALMACK exhibited a specimen of Portland marble.

THE LIBRARIAN mentioned that the Rev. H. E. Booth had presented Linnæus' "Systema Naturæ" to the Library.

DR. FERGUS then gave a lecture, illustrated by numerous diagrams and preparations, on "The Human Eye."

There were 36 persons present.

MEETING HELD MARCH 29TH, 1867.

Ornithology.

G. H. DAWSON exhibited eggs of the Tawny Owl and Rook, taken this year in the Forest, and mentioned notices of the Kingfisher and Snipe.

E. IM THURN exhibited specimens of the four species of Owls found in the neighbourhood.

J. W. PARRINGTON presented a Nuthatch to the society.

Botany.

THE PRESIDENT exhibited specimens of all the wild flowers as yet in bloom.

Geology.

W. D. SMITH exhibited a spine of a *Cidaris* found in the chalk on the London road.

Archæology.

T. R. DUMERGUE gave a short description of the different Tumuli in the neighbourhood.

THE PRESIDENT exhibited a Bronze Roman Lamp, and one of earthenware from Pozzuoli, and a small Etruscan vase from Cumæ.

THE PRESIDENT read a paper, written by J. W. MILLS, on "The Trades of Animals."

P. G. YOUNG was elected a member.

There were 47 persons present.

MEETING HELD APRIL 12TH, 1867.

Ornithology.

G. H. DAWSON gave his Report.

E. IM THURN presented specimens of the common Gull and Rook to the Society's collection.

THE PRESIDENT presented a pair of Magpies.

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Entomology.

F. J. H. JENKINSON gave his Report.

THE PRESIDENT exhibited a Pupa of the Death's Head Moth, which still retained the head of the Caterpillar.

Zoology.

THE PRESIDENT presented a variety of the water-rat.

Geology.

W. D. SMITH exhibited specimens of *Cardium dissimile*, Fossil-wood, and Ammonite, from the Portland beds at Swindon.

J. B. OAKELEY exhibited some fossils found near Monmouth.

Botany.

THE PRESIDENT read a list of notices, and exhibited a species of Corydal *(C. tuberosa)* new to the County, found in the West Woods, as well as a specimen of *Xylaria Hypoxylon*, a Fungus not often found in the neighbourhood.

Archæology.

J. C. PALMER exhibited a Burmese book, written on Palm leaves.

G. H. DAWSON then read the following paper on

EAGLES AND HAWKS.

In speaking of Eagles I shall confine myself to the two which only can strictly be called British Eagles, and which are at all common in this country, namely, the Golden and the White-tailed Eagle. When I say common, you must remember that it is now an unusual thing to see an Eagle anywhere south of the Border, and they are now becoming rare in the lowlands of Scotland. I shall begin, then, at once with the Golden Eagle, which may well be called the king of the feathered tribes. The geographical distribution of this bird is very extensive; it is found in the northern parts of Africa and America, in Russia, Norway, Sweden, the Pyrenees, and the Alps. By the native Indians it is held, as it is by almost every other people, to be an emblem of might and courage, and the young Indian warrior glories in his Eagle plume as the most honorable ornament with which he can adorn himself. The feathers of the Eagle are attached to the calumets or smoking-pipes used by the Indians in their solemn festivals. So highly are these ornaments prized that a warrior will often exchange a valuable horse for the tail feathers of a single Eagle.

In Britain it is far most frequently found in the highlands of Scotland. In size it measures 3 feet in length, and the wings of an adult bird when expanded reach to the extent of 7 feet: the weight of an old bird is about 12 lbs. It may be distinguished from the white-tailed Eagle not only by the different

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colour of its plumage but also from the fact that its legs are feathered to the toes, as you must have noticed in the bird which we now have. Its nest is placed on a high and frequently inaccessible precipice, where it forms a solid platform of several feet in width, built of sticks and branches of trees interlaced with smaller twigs, and covered with layers of reed or heath. The female seldom lays more than 3 eggs, of a dirty white colour spotted with red.

Its food consists chiefly of animals taken alive; scarcely even when very hungry is it known to touch any carrion, in its free state. This statement I must not give as a certainty, for I find that many naturalists are inclined to the opposite opinion. One person declares that he has seen as many as nine Eagles together on the carcase of a dead animal. Sir Walter Scott was evidently of the latter opinion, from the lines in the Lady of the Lake:—

"That Highland Eagle e'er should feed
On thy fleet limbs my matchless steed."

Lambs, fawns, and birds of various kinds form their usual prey; there are several instances on record of their having carried off young children, but I cannot find any very satisfactory proof of this. These birds are said frequently to attain to a very great age; one is said to have died at Vienna in 1719 which had been kept in confinement there for more than a century; but here again I cannot positively vouch for the truth of the statement. The fierceness of this eagle may be subdued in many instances, though it is said to be generally more ferocious than the white-tailed eagle. Thus, for instance, one was taken in the forest at Fontainbleau, in a trap set for foxes, the spring of which broke his claw: his cure was tedious, and attended with a painful operation, which however was borne with the greatest patience. During the operation his head alone was at liberty, but he did not avail himself of this to oppose the dressing of the wound from which several splinters were taken: being then laid on his side, he passed the whole night without motion, and the next day he stood for twelve hours without once resting on his unsound foot. The patience which he showed throughout was so great that his wound was finally perfectly cured. Here, as it seems to me, we have quite a sufficient proof that eagles are not by any means untameable. I find, moreover, mention made of eagles having been used in many places, in the same way as hawks, for taking large game such as deer; they have certainly been so used in Tartary, and it is believed they are employed for this purpose at the present day in Persia and some parts of India.

I have now to say a few words about the White-tailed eagle or Sea eagle as it is otherwise called. In size this bird does not differ materially from the one of which I have just spoken, though generally it is a little smaller; its plumage is of a dusky brown colour with the tail wholly white. As its name, the (Sea

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Eagle) implies, it breeds chiefly on the sea coast, though it is occasionally found inland: its food consist of fish and of the young birds of gulls, &c. Its nest is made most frequently on the ledges of high rocks, though occasionally in large trees; it is often composed almost entirely of sea weed. When this bird is found at any distance from the sea it is generally in the neighbourhood of one of the inland lochs in Scotland. Its eggs are only two in number, of about the same size and shape as those of the goose: when first laid they are probably perfectly white, and the slight colour with which they are marked is only the result of stains. This eagle is frequently attacked by the Skua gulls, who on these occasions always collect in considerable numbers, and sometimes get the victory in these encounters. The gulls never venture to attack the enemy in front, but make short circles around him, and, with a desperate swoop from behind, strike him on the back, and then dart up again into the air almost perpendicularly; the eagle is not able to turn so easily as they can, and hardly knows how to resist the attack. The gulls will persevere in their cowardly attacks for a long time, until at length they put the eagle to an ignominious flight, when they themselves retire in triumph.

I hope I have been able to give you some little idea of these two kinds of eagles: the difference between them as you have seen is considerable both in their food as well as their habits, though the white-tailed eagle is not by any means particular in confining himself to such food as he gets on the sea coast. I did not intend giving you more than just a very short sketch of these birds, and from them I shall pass on to the hawks. I shall not give you a long account of all the different kinds of hawks (which I do not suppose would be of any great interest to most of you) though I shall have some little to say about each one of the family. I shall also tell you about hawking which may not be altogether uninteresting. The terms hawk and hawking are so familiar that it might appear unnecessary to enter into any explanation of them, but in reality they cannot be strictly applied to this whole family of birds, though they are now used indiscriminately when speaking of any member of it: the Goshawk and sparrow-hawk are the only two British types of the family of Hawks, strictly so called; the rest we should more accurately call Falcons: this distinction I think may be dropped by us now as it is when speaking of the subject generally.

As I wish to say a few words about each several member of the family, I must begin with the Ger Falcon otherwise called the Iceland Falcon, which properly heads the list, and was one of the most highly esteemed birds for the purpose of hawking. This bird may be considered the boldest, the most perfectly winged and, in proportion to its weight, the strongest both for action and endurance of all the feathered tribes. It breeds in great numbers in Iceland, as its name implies; thence it was frequently imported and used to fetch a very high price from its great use for hawking purposes.

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The Peregrine Falcon comes next, which was also one of the most important agents in all falconry: a good deal of difficulty has often arisen about this bird from the frequent changes of plumage which it undergoes, at its different periods of life. This species is more common in Britain than the last mentioned; it has been known to breed in the Isle of Wight and is met with annually throughout the Scotch coasts. I find the following account of the daring shown by the peregrine falcon: A young bird of this species had been taken from its nest before it was able to fly, and consequently before it had been much accustomed to slaughtering its prey; being put in a room by itself, it was left for a whole day without food, its wings having been slightly clipped. At the end of the day an old male heron was introduced into the room where the falcon was at liberty, the tip of the heron's bill having been previously sawn off. The falcon took up its post on a stool, which stood at one end of the room, and kept its eye fixed on the heron as the latter traversed the apartment; at length judging the heron to be sufficiently near, she sprung at its head, intending to seize that part with her talons; in this, however, she failed, from the stool not giving her sufficient elevation to make the spring without much assistance from her wings, and the heron dealt a blow with its bill which would have been fatal had the bill been perfect. The same manœuvre was repeated by the falcon several times with equal want of success. At length she managed to establish herself on a box which stood at the opposite end of the room, and supplied a more elevated perch: by this means she could get the required impetus, and suddenly springing from the perch seized the unfortunate heron by the head, and made short work with him in spite of his attempted resistance on the ground. This seems to me a good instance of the daring shown by these birds, since in this case the hawk was a young one and had had no previous practice in encounters of the kind.

We next come to some of the smaller hawks, as the Hobby, which is now rare throughout England; it is inferior in courage to none of the family, and has been frequently known to take birds as large as partridges: it was highly esteemed by some of the most reputed of the old falconers, though chiefly for taking small birds, such as larks—and was also used for the purpose of frightening partridges so as to prevent them from rising, when they might be shot with the cross-bow.

Next is the Kestrel, which is one of the most common of our hawks: these are the birds which we so often notice hovering for a long time in one place, and hence its name of the "windhover hawk," by which it is known in some districts. Beetles form a part of the food of this hawk, a peculiarity shared by none of the others: some naturalists have even asserted that it kills no birds of any kind, but this seems to be a mistake. It is said to have been occasionally used in hawking for partridges and other birds of straight flight, but was probably of no great use to the falconer.

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From it we pass to the Merlin, the smallest of the hawks, but at the same time the most active and beautiful. Not much larger than a blackbird, it has been known to kill a partridge at a single pounce, so great is its power and determination. Its prey consists chiefly of such birds as chaffinches, larks and thrushes; it is said to have been used in hawking for snipes, and to have afforded excellent sport of this particular kind; if this be really the case, we can imagine that it must be a bird of very swift flight indeed.

All the hawks of which I have as yet spoken are distinguished by having long wings, as opposed to the so-called short-winged hawks, about which I shall now say a few words. To these belong the Goshawk, the Sparrow-hawk, and the Buzzards; these are not able to soar aloft and thus reach their prey, or pounce down upon it from any great height, but take it by seizing it near the ground. The Sparrow-hawk is one of the commonest of our British species, though perhaps more shy and untractable than the kestrel. At times, however, it shows great boldness when in pursuit of its prey—one is known to have entered a room where a goldfinch was hung up in a cage, and to have remained there for some considerable time, as the owner on entering found the goldfinch already dead with its feathers plentifully scattered about. As to the strength of these birds it may be noticed when comparing them with eagles as regards their power of carrying great weights, that a sparrow-hawk was once seen to seize upon a weasel, an animal nearly its equal in size and weight, and actually mount aloft with it; it however paid for its rashness by receiving a mortal bite on the throat, whilst the weasel escaped without any serious injury.

The following also is a strong corroboration of the truth of the story just mentioned, and also illustrates the powers of the hawk in raising comparatively heavy weights; whilst it is more curious as displaying the courage shown by a timid animal in defence of its young. A gentleman in Yorkshire while walking in the fields saw a small hawk attempting to fly off with some prey it had just pounced upon, but evidently prevented by the weight of the animal from rising to any height from the ground. It was pursued by a hare, which, whenever it came within her reach, attacked it with her paw, and at last succeeded in knocking it down, when it dropped its prey. At this moment the gentleman ran forward and the hawk and its pursuer both made their retreat, and on reaching the spot he found a fine leveret which had suffered severely from the talons of the hawk. The sparrow-hawks seem to supply their young liberally with food. Mr. Selby mentions having found a nest of five young sparrow-hawks which contained besides them a lapwing, two blackbirds, one thrush, and two green linnets, recently killed, and partly divested of their feathers.

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The Gos-hawk comes last on the list of those of which I wish to give you some little description: it is now rare in England, though formerly it was very plentiful and much valued for hawking. It committed great devastation among partridges; its mode of hunting was to beat a field and when a covey was sprung to fly after them and observe where they pitched, and then rise them a second time, until after a few times the partridges became so wearied that the hawk could secure one or more of them accrding to its pleasure. It is not a very fast flyer, and therefore is unable to overtake the partridge at its first rising.

Having said so much of the different kinds of hawks, I will now try to give you some little idea of the sport of hawking, and also of the training, &c., of the hawks. I will first read you some selections from an account which I find given by an eye-witness of a day's hawking in 1825, in the county of Norfolk, not far from a heronry. From this you will have some idea of the sport in its modern form. The party assembled towards the afternoon, the wind blowing towards the heronry—there were four couple of hawks, all of them belonging to the breed of Peregrine Falcons. These were carried by a man to the ground upon an oblong kind of frame, padded with leather, on which the birds perched, and to which they were each fastened with a leather thong. On reaching the required spot the birds were taken off the frame and fastened to the ground in a shaded place suited for the purpose, with the exception of two which the falconers carried on their wrists, holding between their finger and thumb a small piece of leather attached to the legs of each of the birds. A heron now appeared, and was apparently coming within reach, when each of the men being now ready with a falcon on his fist, and the boy with the lure tied to his waist, and mounted on horseback, they proceeded slowly in the direction from whence the heron was flying; and as soon as the heron was nearly opposite, though at a very considerable height in the air, they slipped the hoods from off the heads of the falcons, holding them still by the bit of leather until they caught sight of the heron, when the sport commenced. The moment the birds were let loose they went off straight as arrows towards the heron, which by this time had gone a considerable distance ahead. As they were dashing away towards it an unfortunate crow happened to cross their path, when one of them instantly darted after him, but he contrived to escape by flying into a plantation, where the falcon followed but did not take him. The other falcon soon overtook the heron, which began to prepare for the attack by disgorging its ballast, consisting of two or three fish; while the hawk, after flying round for a short time in circles, at length soared above him, and, pouncing downwards, struck him on the back, when they both came tumbling down together from a great height to the ground. The second falcon, having lost some time in pursuing the crow, was now flying with all speed to

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assist her companion, and was coming up just as the first falcon and the heron were falling. At this instant a rook happened to fly across, when the disappointed falcon struck at him, and they both fell together within 20 yards of the other pair. No sooner had they reached the ground than each of the falcons began to pull its victim to pieces, but as soon as the falconers could come up the lures were thrown out, consisting of pigeons, and the falcons having been kept fasting for some hours before were allowed to make a meal upon them. The account in the original is a good deal longer than this, but this is enough to show you something what the sport was like.

The origin of hawking is somewhat uncertain, it cannot be traced with any accuracy to an earlier period than the middle of the fourth century. It appears certain that the amusement was first discovered abroad, where it became fashionable some time before it was known at all in this country. The time of its introduction into England cannot be fixed with certainty: but about the middle of the eighth century Winifred or Boniface, Archbishop of Mayence, himself a native of England, presented to Ethelbert, king of Kent, a hawk and two falcons, and about the same time a king of the Mercians requested the same Boniface to send him two falcons which had been trained to kill cranes. In the succeeding century the sport was very highly esteemed by the Anglo-Saxon nobility, and the training and flying of hawks became one of the essentials in the education of a young man of rank. Alfred the Great is commended for his early proficiency in this as well as in other fashionable amusements, and he is even said to have written a treatise on the subject of hawking. It is plain that the amusement, even at this early time must have been very generally followed to call for the prohibition, inserted in a charter granted by one of the Mercian kings to the Abbey of Abington, which forbade all people to carry hawks and thereby trespass on the lands of the monks who resided therein. About the eighth and ninth centuries we are told that the Grand Falconer of France was an officer of great eminence—his annual salary being 4000 florins: he was attended by fifty gentlemen and fifty assistant falconers, and was allowed to keep 300 hawks. He had the right of granting licences to every vendor of hawks in France, and received a tax upon every bird sold in that kingdom. In Doomsday Book a hawk's breeding place (*Aira accipitris* as it is in the original) is returned among the most valuable articles of property, which proves the high estimation in which these birds were held under the early Norman kings, and probably some establishment like that mentioned above was made for the royal Falconer in England. We must notice that the ladies not only accompanied the gentlemen in pursuit of this amusement, but even practised it by themselves; according to a writer of the 13th century they even excelled the men in knowledge and exercise of the art of Falconry, which

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reason he ungallantly produces to prove that the amusement was frivolous and effeminate. Hawking was forbidden to the clergy by the canons of the Church, but the prohibition was by no means sufficient to restrain even them from the pursuit of this favourite amusement.

The practice of hawking declined as might be expected from the moment that the musket was brought to perfection at which time the immense expense attending the training and keeping of hawks became altogether unnecessary. Its fall was very rapid; at the commencement of the 17th century it seems to have been in the height of its glory; at the close of the same century the sport was rarely practised, and a few years afterwards was scarcely known at all.

As to the method of hawking in ancient times, it was performed either on horseback or on foot as occasion required—on foot chiefly when the sport lay in covers. In following the hawk on foot it was customary for the sportsman to have a stout pole with him to assist him in leaping over small ditches, &c., which might prevent him in his progress. This we learn from a fact related by an historian of the name of Hall, who informs us that Henry VIII, while pursuing his hawk on foot attempted with the help of his pole to leap over a ditch half full of muddy water: the pole broke and the king fell head foremost into the mud, where he would have been stifled, had not a footman, one John Moody, who was near at hand and saw the accident, leaped into the ditch and released his majesty from his perilous situation.

There were a great number of laws respecting hawks and hawking, passed at different times; under the Norman kings, none but the nobles were allowed to keep hawks. In the 34th year of the reign of Edward III, a statute was made by which a person finding a hawk of any kind that had been lost by its owner was enjoined to carry it to the Sheriff of his county, who had to make proclamation of the same through all the principal towns of that county. If the person finding the hawk concealed the same, he was liable on discovery, to pay the price of the bird, and to suffer two years' imprisonment, or more in default of payment. In the 37th year of the same reign this enactment was confirmed with still greater severity, and the stealing or concealing a hawk was made an act of felony: in the same reign moreover the Bishop of Ely excommunicated certain persons for stealing a hawk that was sitting upon the perch in the cloisters of Bermondsey in Southwark; but this piece of sacrilege was committed during divine service, and the bird was the property of the bishop himself. During the reign of Henry VII, it was decreed that if any person was convicted of taking from the nests or destroying the eggs of almost any kind of hawk, he should suffer imprisonment for one year and one day, and be liable to a fine at the king's pleasure; he was equally subject to the penalty even if he

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destroyed the eggs on his own land. The severity of these laws may perhaps surprise you until you have heard how highly these birds were formerly appreciated. At the commencement of the 17th century a Gos-hawk was sold for 100 marks, a large sum in those days. In the eighth year of the reign of Edward III, the king of Scotland sent him a falcon as a present, which he not only graciously received, but rewarded the falconer who brought it with a present of forty shillings. It is further said that in the reign of James I, a certain gentleman gave £1000 for a cast of hawks—a cast of hawks according to an old book on the subject signifies two, and a *lese*, I suppose the same as leash, three. It certainly seems strange to us to hear of hawks as so very valuable when we now see them persecuted more than almost any other bird by every gamekeeper in the country.

Having given some idea of the value of a well-trained hawk, I will now give you a very few words on the process of training them. The young birds on being taken from the nest, or perhaps caught when just able to fly, were taken home with great care and a hood or cap placed over the eyes of each bird, and then it was left to itself for a day or two. After this it was quietly placed on the fist, carried up and down for nearly a whole day, and gently stroked with a feather. Having been in some degree tamed by this treatment and accustomed to handling, the hood was taken on and off quickly until it was willing to feed. Meat was then offered, and the hood removed, the falconer making a peculiar call at the same time, which was invariably used whenever it was fed, but on no other occasion that it might become acquainted with the voice of its feeder. It was then taught to alight upon the fist from a perch and receive its food, this was called luring the hawk. When it was so far tamed as to come readily when called, it was allowed to remain wholly unhooded, and then put to the lure, an artificial bird, made of feathers and leather, thrown up into the air. To this a live pigeon or dead chicken was attached which it was permitted to seize, and a part of which it was allowed to eat: during this part of its training it was prevented from escaping by a long string. When quite familiar with the lure, it was taught to fly at live game, chiefly by means of a duck, which was blindfolded that it might not escape. The natural disposition of the hawk would induce it to carry off its game when caught, but this was checked by the skill and kind treatment of the Falconer, and more especially by the use of the lure.

Before I quite leave the subject I may mention the curious fact of the attention shown by the Turks and Egyptians to certain hawks, which probably arises from the respect paid to them in ancient times, when the hawk was held sacred and when accidentally to kill one was punished by a heavy fine, and designedly to deprive it of life was a capital offence. The hawks were worshipped for different reasons, some because they were supposed to destroy

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scorpions, serpents, and other dangerous reptiles; others again were held sacred because the priests or augurs made use of their swift flight in their divinations. By some they were looked upon as sacred from an ancient tradition stating that once upon a time a book bound with a scarlet thread was brought to the priests of Thebes, in Egypt, by a hawk, in which book were written all the rites and customs of the divine worship of the Egyptians. This extraordinary attention was not only shown to the living birds, but was even more marked by the attention paid to them when dead. Their bodies were wrapped in linen folds, steeped in perfumes and precious oils, in order to preserve them, and in this state they are still frequently found in the mummy pits of Egypt. There are still many superstitions among the Egyptians respecting hawks, similar I suppose to the superstitious fears which are felt by the country people in some places about some birds, such as magpies and crows, of which you must all have heard.

This being the third anniversary of the Society's foundation, H. M. Moule, Esq., moved the following motion:—

That this Society, on the completion of its third year, desires to put on record an expression of its sincere gratitude to the President, without whom it would never have come into existence, and whose wide knowledge and unremitting care, have been the main influences at work in bringing it forward to its present flourishing and promising condition.

That the Society's thanks be on this occasion presented to the past and present officers who have devoted their services to its affairs.

This was seconded by C. M. Bull, Esq., and carried unanimously.

There were 50 persons present.

MEETING HELD MAY 3RD, 1867.

Ornithology.

G. H. DAWSON read a list of notices; and exhibited a nest of the golden-crested Wren.

H. M. HILTON exhibited spotted and unspotted specimens of the eggs of the Jackdaw.

E. IM THURN exhibited a specimen of the Black-backed Gull, shot in the neighbourhood.

Entomology.

F. J. H. JENKINSON read a list of notices. J. W. Parrington exhibited a specimen of *H. Abruptaria.*

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Geology.

J. B. OAKELEY exhibited some specimens of *Terebratulæ* and a curious flint deposit.

THE PRESIDENT exhibited a specimen of Platinum.

THE PRESIDENT then read the following paper, illustrated by Photographs, Diagrams, and specimens, on

THE GIANT'S CAUSEWAY.

One of the most wonderful natural objects to be seen in Ireland is the Giant's Causeway, situated in the N.W. of the Island, on the coast of the county of Antrim. The whole surface of this county is composed of, what is termed by geologists, *Trap*, except a small patch of porphyry, yielding a fine white building stone, N. of the town of Antrim. Below this trap occurs a bed of indurated Chalk, and below that Greensand, New Red Sandstone, and Mica Slate—this latter crops out to the West of Londonderry, and in the N.E. of Antrim, thus showing that it extends quite across the county.

For a distance of about two miles inland the ground gradually rises towards the sea till it ends abruptly in a precipice, in many places quite perpendicular, and often 350 or 400 feet high. Here a wonderful sight presents itself. For a distance of four miles along the coast an irregular platform, interrupted by promontories, and composed of the tops of 40,000 pillars, slopes down to the sea, and under it, as far as the eye can reach. The columns themselves are very interesting objects—they are in general about 15 or 20 inches in diameter, one only triangular, three have nine sides, and the majority of the rest five, six, or seven sides. Five and six sides seem to prevail the most. The distance from the bottom of the precipice to the sea is about 730 feet; but the Causeway (as stated above) extends under water, and it is not improbable that it reaches as far as the Island of Staffa, or if the two formations (for at Staffa we meet with a similar formation, known by the name of Fingal's Cave) are now separated, that they originally formed one immense continuous bed of Columnar Basalt.

These pillars fit so closely together that it is impossible to get an instrument between two contiguous ones, in fact a sheet of ordinary paper could barely be inserted between those furthest apart. These columns, moreover, are not formed of one continuous piece of Basalt, but are jointed, and though each joint is perfectly distinct, it is impossible to separate one without damage; the manner in which these pieces are united forming another very interesting feature about the columns. The end of one of these joints has either an indentation or projection, exactly circular, the circumference being as nearly as possible that of the inscribed circle of the polygonal boundary of the

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column. If the upper end has a circular indulation, it is exactly fitted by the corresponding projection of the under surface of the joint next above it; but these projections are sometimes on the upper and sometimes on the under surface, so that there is no regularity in this respect. There are, of course, portions of the surface between the circular portion and the edge of the column, especially at the angular points; and these portions are modified so as to form projections upwards or downwards, entirely securing the contiguous joint of the pillar, so that it is necessary to break off the angular projections in order to separate the joints. As the upper surfaces of the joints are indifferently convex or concave, and as the joints themselves do not all lie in the same horizontal plane, it is evident that the "Causeway" is not level, though, as the joints are not very long, when the ends of the pillars form a large surface, it becomes approximately so; in fact in some places the surface is very uneven and groups of pillars have been left projecting above the general surface, many of which have received various fanciful names, as the *Giant's Chair*, the *Priest and his Flock*, the *Nursing Child*, the *King and his Nobles*, &c. Where the pillars have been broken away, so as to leave others of considerable length exposed to view, they have been named the *Organ*, the *Loom*, &c.

Turning from the Causeway itself to the cliffs in which the land terminates, a magnificent spectacle presents itself. Though the Columns of Basalt appear in places they are not more than about 80 feet in length, and appear in layers one above one another. But besides these, the other strata also crop out in this cliff, and thus the dark basalt alternating with the white chalk, the green and red sandstones, and conspicuous beds of lignite and red ochre, which here present themselves, relieved by the bright green of the grass and ferns which find a lodgement on the various projections of the cliff, present a sight as peculiar as it is beautiful.

Two portions of this cliff especially deserve notice.

1.—The *Giant's Amphitheatre*—a bay in the form of an exact semicircle, with the sides everywhere sloping down at the same angle. Round the upper part runs a row of columns 80 feet high; then comes a broad rounded projection, like an immense bench, for the accommodation of the guests of the giant Fin Mac Coul (by whom the Causeway is reputed to have been made); next a row of pillars 60 feet high, and then again a gigantic bench, and so on down to the bottom, where the water is enclosed by a circle of black boulder stones, like the limits of the arena.

2.—The *Pleaskin*, the finest of the promontories which jut out and break the surface of the Causeway. It is at this point more especially where the columns appear in ranges, and the cliff seems as if painted from the brilliancy with which the different strata are here presented to view.

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On one of the promontories stand three isolated pillars. The tallest is about 45 feet high. It is said that one of the ships of the Spanish Armada mistook the columns (which were more numerous then) for the towers of Dunluce and wasted their ammunition in firing at them.

There are also two caves which deserve notice.

Portcoon Cave, half-a-mile W. of the Causeway, is only remarkable, apart from its pillars, for its echo, which is tremendous when a shot is fired. "The story goes that this cave was inhabited by a hermit, who, having sworn a solemn oath never to touch food brought to him by human hands, was fed by seals, who carried him provisions in their mouths."

Dunkerry Cave, which can only be entered by water. It is remarkable for the sensation caused by the rising of the water within in response to the swell of the ocean. "As each successive wave rolls into the cave, the surface rises so slowly and awfully that a nervous person would be apprehensive of a ceaseless increase of the elevation of the water till it reached the summit of the cave." This is however 60 feet above high water mark.

At the Giant's Causeway the columns are seldom more than 30 feet high, or one foot broad; but at Fair Head, at no great distance from it, some are no less than 317 feet high, and the *sides* sometimes five feet broad—in fact the whole Head is composed of these columns. It is at this point, too, where the lignite is especially developed. It occurs generally in narrow bands at the Giant's Causeway, but at Murlough Bay, south of Fair Head, it is in such quantities as to pay the cost of working.

It only remains to say a few words on the nature of Basalt and the origin of basaltic pillars. Basalt has the same composition as greenstone (being principally composed of two minerals, augite and felspar), only more fine and granular, and is of volcanic origin. It is, perhaps, the commonest of the volcanic rocks, there being many thousand square miles of it in the Decean in India, as well as large quantities of it in America and elsewhere; and it is by comparing the different formations that we are enabled to obtain a clear insight into the origin of the peculiar form in which it appears at the Giant's Causeway. That it is of volcanic origin there may be inferred at once, from the effect produced on the adjoining strata: for wherever it has come in contact with them, it has affected them for some considerable distance; thus the old Red Sandstone has been converted into Hornstone; the Clay Slate into Flinty Slate; the Coal into Coke; and the Chalk into Granular Marble. This latter is called by the natives Limestone, and is used for building purposes. When burnt it produces a lime more powerful than ordinary lime, and is used extensively as whitewash for purifying the Cottages.

But the question which more especially concerns us is, how have these *Columns* been formed, and why are they jointed? Are they the result of

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crystallization? For a long time it was considered that they could not be the result of crystallization, because when split, they presented no *planes of cleavage*; for every crystal can be split more easily in some directions than in others, and when split in these directions always presents a smooth surface, but basalt does not have this peculiarity, and thus the idea of the columns being the result of crystallization was denied. It is now, however, decided that this columnar form is the result of crystallization from cooling under pressure. Mr. Gregory Watt fused 700 lbs. weight of Dudley Basalt, and caused it to cool slowly. Globular masses were formed, which by being continually enlarged pressed against one another until regular columns of basalt were formed. When, again, these columns are examined in a state of incipient decay, the edges are observed to crumble away, and the central portion to assume the form of a ball or egg. This is very visible in other localities; Titan's Piazza, for instance, in Massachusetts, consists of masses of greenstone (similar in composition to Basalt), which have decayed so as to assume large egg-shaped masses. At Bertrich Baden there is a Basaltic cave called the *Grotte de Fromages* (Grotto of Cheeses), because the different joints of the Basaltic columns have become sufficiently decayed so as to assume rounded forms, and thus the cave appears to be formed of columns of cheeses. In other formations, too, we observe that these columns are perpendicular to the cooling surface, and hence there is no doubt whatever but that the basalt was originally thrown up in a state of fusion, that on cooling rows of "centres of crystallization" were formed, which by continually increasing at length pressed against one another, and ultimately formed columns such as we see at the present day at the Giant's Causeway.

The Basalt contains many cavities filled with Calcedony, Zeolite, and Semi-opal. In some instances the cavity is not completely filled with the calcedony or opal: and when that is the case the empty space is observed to be always the upper part of the cavity, when the rock was in its proper place; moreover the surface of the calcedony or opal next to the empty space is always found to be flat and horizontal, which would show that the substance must have been filtered into its situation in a fluid state, and afterwards consolidated.

It may, in conclusion, be interesting to know how the peculiar shape of these pillars would be assumed by the action of water. The Basalt is supposed to have been first of a clayey consistence, and to have been heated by an underground volcano. The *horizontal* divisions are presumed to have taken place from the mass drying in layers. When clay dries by the action of the atmosphere it contracts, and so, in like manner, as the large mass of Basalt dries, each layer would be separated from the one below. The vertical splitting into columns is supposed to have been caused by the action of the

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Volcano underneath. "When the volcano begins to work, a great quantity of the water always present on these occasions, is driven upwards in exhalations and vapours: these possess a penetrating and softening power, by means of which they would also produce the first effect of splitting the mass up into horizontal layers; but when they are increased in sufficient quantity, they force this tough, moist substance upwards like a bubble, which then gradually falls, and during this time bursts into the columns as actually presented by the basalt."

There, are, however, great objections to this explanation. The joints of the different columns, as has been noticed, do not lie in the same plane, and hence there could not be a layer produced by the drying process; nor again is there any reason why it should dry in layers at all unless the process of drying ceased at regular intervals—so, again, in the splitting into columns, the surfaces of the columns are far too smooth and regular to allow of such an hypothesis. This theory, however, was merely started because there were no actual traces of crystallization, but, as has been shown, the absence of these traces has been accounted for.

There were 51 persons present.

MEETING HELD MAY 10TH, 1867.

Entomology.

F. J. H. JENKINSON gave a Report.

Ornithology.

G. H. DAWSON read a list of Notices, and exhibited eggs of the Dabchick and Chaffinch (?).

Geology.

W. D. SMITH exhibited some Coralline Oolite, full of fossils.

THE PRESIDENT exhibited some Balaclava rock and some flints, with conical hollows, from Reigate.

Archæology.

T. R. DUMERGUE exhibited Diagrams of the Marlborough Mount, Silbury Hill, and Waterloo Mound, drawn to scale, showing the great size of the latter, which is the largest artificial mound in Europe.

Botany.

THE PRESIDENT showed specimens of all the plants in flower, as well as of the Gulf-weed (*Sargassum bacciferum*), and a cucumber, with a leaf growing out of its side.

G. F. RUCK exhibited a fasciculated Buttercup.

T. E. MACLEAN read a paper on Beetles.

There were 41 persons present.

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MEETING HELD MAY 24TH, 1867.

Entomology.

F. J. H. JENKINSON read a list of Notices.

Botany.

THE PRESIDENT passed round a list of the various flowers found during the half-year, and exhibited a fungus of the genus *Cordiceps* and read the results of some observations on the Giant Puff-ball (*Lycoperdon giganteum*). "In 14 days it had a circumference of 41 inches, "and weighed nearly 7¾ lbs. When completely dried it was found, "that in a fresh state it contained 91·28 per cent. of water; the "total number of cellules was 14,589,140,400 which had been formed "at the rate of 12,000 a second. It had also formed 1,200,000 spores, "and extracted the carbonic acid gas from ⅞ of a pint of air every "second."

Ornithology.

G. H. DAWSON read out the Notices obtained during the past fortnight, and exhibited peculiar varieties of the eggs of the Greater Tit and Song Thrush. J. W. Parrington, those of the Garden Warbler, and A. Herklots, those of the Rook, and Greater Tit. E. Almack and E. im Thurn passed round nests of the Humming Bird; the latter of whom also exhibited a White Sparrow and Mottled Blackbird.

Zoology.

THE PRESIDENT exhibited a specimen of *Mermis nigrescens*, a thread-like animal, living either in water or damp earth, which had been discovered by J. B. Gilmore, Esq., on the leaf of a dandelion, and which had appeared in great numbers in some parts of England.

W. R. CARLES then read a short paper on Frogs.

THE LIBRARIAN mentioned that J. B. Gilmore, Esq., had presented Dana's Mineralogy to the Society; H. A. Evans a work on British Spiders, and the President Morris' Catalogue of Fossils.

There were 38 persons present.

The following paper on the Genus Eupithecia, kindly written for the Society by the Rev. Joseph Greene, was read at one of the meetings of the Entomological Section.

THE GENUS EUPITHECIA (*Curt.*)

The pretty and interesting little insects contained in this Genus are known familiarly to the "brotherhood" by the name of "Pugs." It seems at first difficult to decide upon the origin of this term. If, however, the name

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Eupithecia be derived from εὐ-πίθηκος (resembling apes), then, as these latter, when kept as "pets," are often denominated "pugs," we may possibly find the explanation in this fact. Why Mr. Curtis considered them as resembling apes it is not for me to say.

In the first edition of "Westwood and Humphrey's British Butterflies and Moths," thirty-five species are described. Of these, at least ten may be discarded as mere varieties. Of the remainder, about twelve may be recognized from the figures, which are good. But, as regards the rest, owing to the bad colouring, and the vague descriptions given in the letter-press, it is quite impossible to determine what they are. Mr. Westwood, however, is not to blame for this, as no amount of skill in word painting will enable the collector to separate the closely allied species. This can only be done by comparing the perfect insects—but, better still, by rearing them from the larva. In the year 1849, Mr. H. Doubleday called the attention of entomologists to this Genus, observing that they had been very little attended to in Britain, and that probably many new species would be discovered. This appeal does not seem to have produced much fruit. About 10 years later, the Rev. H. H. Crewe applied himself to the work in the only way which offered a prospect of success, viz., by breeding. His great skill and unwearied assiduity have produced astonishing results, which may be briefly summed up as follows:—We have now forty-seven clear and well-defined species, and the nomenclature satisfactorily settled. Of these one (*Fraxinata*, Crewe) is new to science. The larvæ of no less than *forty* have been discovered (the vast majority by Mr. Crewe) and described, leaving only seven yet unknown. They are—*Consignata*, *Egenata*, *Irriguata*, *Pernotata*, *Pygmæata*, *Subciliata*, and *Togata*. The discovery of the larvæ of one or more of these would be a great feather in the cap of the Marlborough College Entomologists.

I shall now proceed to give a list of the species as at present ascertained, with the time of appearance of the perfect insect and larva, together with the trees and plants (when known) upon which they feed. I shall then add some remarks upon all, or most of them, and conclude with a few hints as to searching, breeding, pairing, &c.

Species.	Imago.	Larva.	Food.
1. Venosata ...	June	August	Campion and Catchflies (seed)
2. Consignata	April & May	...	Apple ?
3. Linariata ...	June	July & Aug.	Toadflax (flowers and seeds)
4. Pulchellata	July	August	Foxglove (flowers)
5. Centaureata	Ditto	Sept. & Oct.	Ragwort, Saxifrage, &c. (seeds)
6. Subfulvata	Ditto	Aug. & Sept.	Yarrow (flowers and seeds)
7. Succenturiata	Ditto	Sept., &c.	Atriplex (ditto ditto)

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Species.	Imago.	Larva.	Food.
8. Subumbrata	Ditto	Aug., &c.	Centaurea, Scabious, &c. (flowers)
9. Pernotata ...	...	...	Golden rod ?
10. Plumbeolata	June	...	Melampyrum arvense
11. Isogrammata	May	August	Clematis vitalba (buds)
12. Pygmæata ...	...	May ?	Stellaria holostea ?
13. Helveticata	April	Aug., &c.	Juniper
14. Arcuthata	May	Ditto	Ditto
15. Satyrata.....	June	Ditto	Scabious, Knautia arvensis, &c.
16. Egenata.....	...	...	[(flowers)
17. Castigata ...	June	Aug., &c.	Various plants (flowers & seeds)
18. Lariciata ...	May, &c.	July	Fir
19. Virgaureata	Ditto	Sept., &c.	Golden-rod, Ragwort (ditto ditto)
20. Trisignata ...	June	Ditto	Angelica sylvestris (ditto ditto)
21. Valerianata	Ditto	July	White Valerian (ditto)
22. Pusillata ...	Ditto	Ditto	Fir
23. Irrigata ...	Ditto ?	...	
24. Pimpinellata	Ditto	July	Pimpinella saxifraga (ditto ditto)
25. Fraxinata ...	Ditto	Aug., &c.	Ash
26. Albipunctata	Ditto	Sept., &c.	Angelica sylvestris (ditto ditto)
27. Indigata.....	May	July	Fir
28. Distinctata	June	Aug., &c.	Thymus serpyllum (ditto ditto)
29. Nanata	Ditto	Sept.	Heath and Ling. (ditto)
30. Subnotata ...	July	Aug., &c.	Atriplex (ditto ditto)
31. Vulgata	May, &c.	Ditto	Anything
32. Campanulata	June	Ditto	Campanula trachelium (ditto)
33. Expallidata	July	Sept., &c.	Golden-rod (flowers & seeds)
34. Absynthiata	Ditto	Ditto	Ragwort (ditto ditto)
35. Minutata ...	June	Ditto	Heath and Ling. (ditto)
36. Assimilata ...	Ditto	Aug., &c.	Currant
37. Tenuiata ...	Ditto	April	Sallow catkins
38. Subciliata ...	August	...	
39. Dodonæata	June	Sept., &c.	Oak
40. Abbreviata	April	June	Oak
41. Exigusta ...	June	Aug., &c.	Barberry, Bramble, &c.
42. Sobrinata ...	July	May, end	Juniper
43. Togata	June	...	
44. Pumilata ...	April & July	June & Aug.	Anything
45. Coronata ...	June	Aug., &c.	Clematis vitalba (flowers)
46. Rectangulata	July	June	Apple
47. Debiliata ...	Ditto	May	Vaccinium myrtillus

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Of the foregoing, Nos. 5, 17, 31, 34, 36, 41, 44, and 46 may be considered common everywhere; 1, 3, 4, 11, 19, 20, 26, 29, 32, 35, 37, and 42 common where the food plant is plentiful; 6, 7, 8, 10, 12, 13, 15, 18, 21, 22, 24, 25, 27, 28, 30, 33, 39, 40, 45, and 47 uncommon or local; while 2, 9, 14, 16, 23, 38, and 43 are, as yet, very rare. In the course of four or five years the collector may hope to obtain nearly all the species, excepting the last seven, and a few of the very local ones. I shall now make a few remarks upon each species.

1.—*Venosata.* This, perhaps the prettiest species in the genus, is by no means uncommon. It feeds in the seed capsules of the common red Lychnis *(Lychnis diurna)* and Bladder-campion *(Silene inflata)*, much preferring the latter however, and wherever it occurs in plenty the insect is almost sure to be found. The best way of searching for the larva is to examine the seed heads, when, if a small round hole is discovered, the edges of which are surrounded with "frass" (*i.e.* the excrement), a larva is almost certainly within, and the head may be at once gathered, without opening it. As, however, the larvæ of several Noctuæ feed on the same plant, and in the same manner, if it be required to know certainly what the larva is, it will be necessary to open the head.

2.—*Consignata.* This is as yet one of our rarest insects. Nothing at present is known of the larva, but there seems little doubt that it feeds on the Apple tree, probably in the autumn. The perfect insect should be looked for in *orchards*, where it settles, in the daytime, on the trunks of the trees, generally rather high up. It is not at all unlikely to occur at Marlborough. It has been taken regularly, though in small numbers, for some years past, at Leominster, in Herefordshire, and I have once met with it myself in Gloucestershire. Young collectors have generally sharp eyes, and if they could procure a female might possibly get some eggs. In this case they would have the credit of diminishing by one the mystic number of the seven unknown.

3.—*Linariata.* This very pretty insect occurs generally where the Toadflax (*Linaria vulgaris*) is common, and the larva may be taken, either by beating the flowers into an umbrella, or by examining the seed pods, as in *Venosata.*

4.—*Pulchellata.* Until the last two or three years the larva of this species was unknown, and, though the perfect insect was taken not unfrequently, the specimens were generally wasted. The larva may now almost certainly be taken wherever the Foxglove (*Digitalis purpurea*) abounds. The way to find it is as follows:—Examine the *flowers.* If the tips of one appear fastened together gently press it. If not spun together the lips will open. If, however, under this pressure they adhere together, then it is almost certain that a caterpillar is inside, and the flower should be carefully plucked. It is a beautiful insect when bred. Care should be taken to lose no time in searching for the larvæ when the Foxgloves are in bloom, as the flowers soon fall from the

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stalks. Plants growing in hedgerows seem more productive than those in woods.

5.—*Centaureata.* This is a common insect. The larva feeds in a great many plants, preferring, however, according to my experience, the Ragwort *(Senecio jacobœd.)* and especially the Burnet saxifrage *(Pimpinella magna)*. From the former it is best taken by beating into an umbrella—from the latter, by sweeping, or carefully examining the seeds. It is a very variable larva, and, from the fact that both its colour and markings are more or less influenced by the plant on which it is feeding, it often puzzles the collector.

6.—*Subfulvata.* There is nothing very noticeable about this species. I have frequently taken the perfect insect on the blossoms of the common Privet, the flowers of which it seems very partial to.

7.—*Succenturiata.* This is a rare, or at least local, species. It appears to prefer the coast. In its natural state, the larva seems to feed on the Mugwort *(Artemisia vulgaris)*, *Atriplex*, &c. In confinement, it will take to the Yarrow *(Achillea millefolium)* though it does not seem to thrive upon it.

8.—*Subumbrata.* This is also a rare species, but not uncommon where it occurs. The perfect insect may occasionally be taken in the day time, by beating the trees, where the insect is found.

9.—*Pernotata.* Of this nothing is known accurately. Mr. Doubleday, I believe, has a specimen. The larva is said to feed on Golden-rod.

10.—*Plumbeolata.* The larva of this species for a long time baffled Mr. Crewe. It was at last discovered, in 1865, to feed upon *Melampyrum arvense.* It is said to be difficult to detect, and has been bred by but few. I have not met with it.

11.—*Isogrammata.* This little insect is sure to be met with wherever the Traveller's joy *(Clematis vitalba)* abounds. The larva feeds in the unopened buds, not flowers or seeds, and its presence may easily be detected by the little brown hole at the side of the bud. Many are, however, destroyed by a small brown bug, which, by some means or other, gets inside the bud, and, having seized the unfortunate larva with its proboscis, does not relinquish its hold until it has extracted all its juices, leaving nothing but a dry and shrivelled skin.

12.—*Pygmœata.* Larva unknown. Supposed to feed on *Stellaria holostea.*

13.—*Helveticata.* This is a Scotch insect. I am not aware of any English locality. The larva feeds on the common Juniper *(Juniperus communis)*.

14.—*Arceuthata.* Mr. Crewe has taken what is supposed to be this species, at Drayton Beauchamp, Bucks. It feeds on the same plant as the preceding.

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15.—*Satyrata.* Local, but not uncommon. The larva is found on a great many plants, as *Centaurea nigra, Knautia arvensis,* &c. In confinement it will feed on the flowers of the common Dandelion.

16.—*Egenata.* Concerning this species I know nothing, either of the larva or perfect insect.

17.—*Castigata.* Common everywhere. The larva may be found, feeding on almost any flower.

18.—*Lariciata.* This species closely resembles the preceding in the perfect state, but differs widely from it in the larva. It was only discovered in 1865. It seems by no means rare, and will probably be easily taken, by beating larch and fir in various localities.

19.—*Virgaureata.* This also closely resembles the two preceding species. It seems rather local, but where it does occur it is abundant, that is, in the larva state. The specific name indicates the food plant, Golden-rod. It is, however, found just as commonly—according to my experience, much more so—on Ragwort. I have taken it in profusion on the Cumberland and Cheshire coasts. It has a habit of twisting itself into something like the form of an S, by which, and its much slenderer shape, it may easily be distinguished from *Absynthiata.*

20.—*Trisignata.* This is a dull coloured, but very distinct species. It was first discovered in this country, a few years since, not far from my house. It has since been taken in many other localities. The larva may be known at once by its *black* head; it eats the flowers and seeds of the common *Angelica sylvestris.* Wherever this plant occurs in any profusion, the insect will probably be found, though it seems to be rather rarer and more local than *Albipunctata,* of which mention will be made hereafter. This plant seems to flourish best in moist marshy places, and though it grows in damp ditches, &c., I have never found the larva except in *woods,* plantations, &c.

21.—*Valerianata.* This insect was first taken in this country in the year 1858, and was then described by Mr. Doubleday as new to science, under the name of *Viminata.* Subsequent investigation has shewn it to be identical with Hübner's *Valerianata.* It is a very dull-coloured insect, and continued to be very rare until Mr. Crewe discovered the larva. It is still far from common, and is in few collections. The caterpillar feeds on the *flowers* of the White Valerian (*Valeriana officinalis*). This plant grows in osier beds, damp ditches, &c., and if the insect occurs at all in the locality, the larvæ may be taken in some plenty. As the flowers are very short-lived, and speedily drop off, care should be taken to search at the exact time. The best way is to beat them into an umbrella.

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22.—*Pusillata.*—Not much is known about this species. It is not a common insect.

23.—*Irriguata.* Very rare. The perfect insect has been taken in North Wales, and some other localities, with which, however, I am not acquainted. The larva is said to feed on the Sloe *(Prunus spinosa)*, but I am not aware of its having ever been bred in this country; it is in few collections, and I do not possess a specimen.

24.—*Pimpinellata.* Not common. The larva feeds on the seeds of *Pimpinella saxifraga.* It is, however, difficult to find, except by sweeping. A careful examination will disclose the larvæ rigidly extended from the slender stalks, but they so closely resemble these stalks as to require a very experienced eye to detect them.

25.—*Fraxinata.* This insect is new to science, and has been described and named by Mr. Crewe. It was formerly confounded with the Continental *Innotata*, which it closely resembles in the perfect state, but the larvæ differ widely, both in appearance and food—that of *Fraxinata* feeding *exclusively*, in a state of nature, upon *ash*, while *Innotata* is found on various wild plants. This must be regarded as one of the rare species. The perfect insect is sometimes taken at light, and the larva occasionally on ash. Unquestionably the best way of procuring the insect is by searching for the pupa; this may be done throughout the winter and early spring. It lies concealed under the moss collected upon the trunks of ash trees, especially near the edges, and the moss must therefore be very carefully removed with the hands. Were this plan more generally adopted, I have little doubt that the insect would become commoner, as I can generally take from four to twelve in a season, and others who have tried it have met with similar success. It requires, however, a very considerable amount of patience and perseverance.

26.—*Albipunctata.* The larva may be taken in abundance upon the same plant as *Trisignata.* I have, however, observed that where *Albipunctata* is plentiful, *Trisignata* is rare, and *vice versâ.* I mean when they occur in the same locality. The larva is very seldom found except upon such plants as grow in woods. On one occasion, however, I might have taken hundreds feeding on Angelica, in a marshy field in Suffolk. Both species are sometimes on *Heracleum sphondylium.*

27.—*Indigata.* Not common.

28.—*Distinctata.* The larva feeds on *Thymus serpyllum*, but it is extremely difficult to find, owing to the nature of the plant.

29.—*Nanata.* This is exclusively a heath insect, and it is not at all uncommon. The caterpillar is very pretty, and may be taken in abundance, by sweeping the Heather and Ling.

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30.—*Subnotata.* Not very common. Best taken by sweeping the food plants, the various species of *Atriplex* and *Chenopodium.*

31.—*Vulgata.* This, as its name indicates, is a very common insect. It is very fond of settling upon palings in the daytime. The larva will feed upon any plant, and a good many trees.

32.—*Campanulata.* This insect was only added to our list in 1864. The larva feeds in the seed capsules of the Nettle-leaved Bell-flower *(Campanula trachelium)* and wherever that plant grows, the insect has been taken in plenty. In confinement it will readily feed upon the various species of garden *Campanula.*

33.—*Expallidata.* This is one of the largest and finest insects in the Genus. The larva also is very handsome; it feeds upon the flowers and seeds of the Golden-rod *(Solidaga virgaureæ)*, but in confinement will eat Ragwort, preferring, however, the former plant. It is a rare moth, but may occasionally be taken in some plenty where the Golden-rod abounds, especially when it grows in cleared spaces in woods.

34.—*Absynthiata.* This is a very abundant species in the larva state, and may almost certainly be taken wherever Ragwort grows.

35.—*Minutata.* Exclusively a heath insect, and the larva may commonly be taken by sweeping.

36.—*Assimilata.* Common. The larva feeds on the leaves of various Currant trees, also the wild Hop. Its presence may easily be detected by the little round holes gnawed in the leaves; upon turning them up, the caterpillar will be seen lying extended upon the midrib.

37.—*Tenuiata.* The larva of this pretty little species feeds inside the catkins of the Sallow (*Salix caprœa*). The best way to procure it is by gathering a large quantity of the catkins just before they are ready to fall. These should be placed in a good-sized box, with a gauze cover. Nothing more is required, and the insects will appear in June and July.

38.—*Subciliata.* This is a rare species, and at present nothing is known of the larva. It is almost certain, however, that it feeds on the common Maple, and probably in woods.

39.—*Dodoneata.* Larva feeds on Oak, probably also on Hawthorn, as I have taken the pupa under loose bark on those trees.

40.—*Abbreviata.* This and *Helveticata* are the two earliest of the Eupithecise on the wing. The larva feeds on Oak, and the pupa may occasionally be taken at the roots of that tree.

41.—*Exiguata.* The larva of this species is one of the prettiest in the Genus. It feeds on Bramble, Sloe, Barberry, and other shrubs. It is rather common, but seems uncertain in its appearance. The perfect insect is frequently taken on the wing, or settled upon palings, &c.

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42.—*Sobrinata.* Common where Juniper grows.

43.—*Togata.* This is far the largest species in the Genus, and, when fresh, the handsomest. It is very rare, and, so far as I know, has only occurred in Bucks, at Black Park and at Halton, where I twice took it. The larva is as yet unknown, but is supposed to feed either on larch or fir, from the fact that the perfect insect has always been beaten from those trees. This is, however, a very fallacious test, as many species which feed on low growing plants are in the habit of concealing themselves, when in the perfect state, among the foliage of the surrounding trees.

44.—*Pumilata.* Double brooded. The larva will feed on almost anything.

45.—*Coronata.* The larva of this delicate species feeds in the *flowers* of *Clematis vitalba.* It is difficult to rear. The best way to take it is to shake, not beat, the flowers violently into an umbrella.

46.—*Rectangulata.* This is a very common insect, and may be taken in almost any orchard, settled upon the trunks and branches.

47.—*Debiliata.* Till lately, the larva was unknown. It feeds, early in the spring, on *Vaccinium myrtillus,* spinning two or three leaves together. This latter habit is found in it alone of all the Eupithecise. It seems to be an extremely local species, but is common where it does occur. The perfect insect seems very fond of settling in hollow trees during the daytime.

Capturing, rearing, &c. Very few of the insects in this Genus are to be taken on the wing, and of those that are, the vast majority are, more or less, wasted and unfit for cabinet specimens. Still fewer are to be taken in the pupa state. There remains, therefore, only searching for the caterpillars. This may be done in three ways, beating, sweeping, and searching. To commence with the last. By searching, I mean the careful and minute examination of the plants and flowers on which the larvæ feed, without having recourse either to beating or sweeping. There are several species which can *only* be obtained in this way—there are many others, which *may*. The former are Nos. 1, 3, 4, 11, 28, 32, 47. For sweeping it will be necessary to procure a small iron hoop, about the thickness of a common clay pipe-stalk, and ten inches, say, in diameter. This must be firmly inserted into a wooden handle, which may be two feet in length. To the hoop must be fastened a calico bag. The length is immaterial, but a foot and a half will be enough. The part of the bag which laps round the hoop should be very thick and strong, else it will soon be frayed away by the friction. With this net, the herbage, and low growing plants are swept from side to side, or backwards and forwards. After a dozen or so strokes, the bag is turned inside out, and the debris carefully examined, and a wonderful medley it generally is, bees, wasps, spiders, earwigs, flies of all sorts, bugs, &c. The species to be sought in this way are, 10, 24, 29, 35. Though only four species are given as being most

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easily procured by sweeping, it must be remembered that the *net* is most useful in obtaining the larvæ of many other insects.

Beating is the simplest operation in the world. Seize a quantity of the flowers in one hand, and beat them on the ribs of an open umbrella, or, if preferred, strike the flowers with a small stick. This is all. The tree and shrub feeding larvæ of course *must* be beaten. What these are, may be seen by referring to the list. The larvæ, when found, should be put with some of the food into chip pill-boxes, and these in their turn into a bag, for convenience sake. In the case of flower and seed eating larvæ, six or eight may be placed in the same box, if a good supply of flowers be put in with them. Where, however, they feed on trees or shrubs, it is better to put only one larva in each box.

The rearing of these little creatures is very simple and easy. An examination of the list will show, that, out of the forty known larvæ, twenty-eight feed on various plants. To rear these, procure half-a-dozen moderate-sized chip toy boxes, or something similar. Knock out the lids, and cover the frame with gauze. Cover the bottom, to the depth of an inch, with fine mould—upon this put a thin layer of loose moss. It is well to *bake* both mould and moss. Your apparatus is now ready, and all that remains is, to put in a handful or two of the flowers, or seeds varying in quantity according to the number of larvæ. For those larvæ, which feed on the following plants, nothing more will be required than occasionally to renew the food, which may be thrown in on the top of that already there; Campions, Catchflies, Toadflax, Foxglove, Ragwort, Yarrow, Orache, Knapweed, Scabious, Golden-rod, Clematis, Thyme, Campanula, Sallow Catkins. As regards the remaining flowers, as well as trees and shrubs, in order to keep the food fresh, and to avoid constant renewing, the best plan is as follows:—Procure a few short bottles, about 2½ inches in length. Fill these with water, and place the flower or sprig of the tree in them, first twisting a little cotton wool round that part of the stem, which meets the neck of the bottle. These bottles thus prepared must be placed in some upright vessel, as a tin box, jam-pot, &c., from 10 to 12 inches in height, so as to allow room for the plant. Surround the bottle with mould and moss as before, and, having tied a piece of gauze on the top, your case is ready.

I think I have now said enough, but any further information will with pleasure be given to any one who may apply to me by letter.

Let me, in conclusion, strongly recommend the pursuit of this Genus to the College Entomologists. The species are numerous, and many of them very pretty. The larvæ are extremely easy to find, and when found, bred with equal ease. The food plants, or most of them, are common everywhere, and lastly, the apparatus for finding and rearing the caterpillars extremely simple

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and inexpensive. For the former nothing is required but an umbrella, a walking stick, and in some cases, a sweeping net; for the latter, only a few boxes, jam-pots, or, in fact, anything that will prevent the larvæ from escaping. I give my address, in case any one might wish to apply to me for further information.

CUBLEY RECTORY,
SUDBURY, DERBY.

MEETING HELD JUNE 14TH, 1867.

Ornithology.

G. H. DAWSON read a list of Notices observed since the last meeting, and exhibited eggs of the Grasshopper Warbler, and Reedwren.

E. IM THURN exhibited a duck with four legs; the skin of the Laughing Jackass, an Australian species of Kingfisher; and a case of Hawks, which he presented to the Society.

J. W. PARRINGTON exhibited some discoloured eggs of the Great Tit, from a deserted nest.

A pair of Pheasants in their ordinary plumage, and a pair of the pie-bald variety of the same, presented to the Society by Mr. Gauntlett, head gamekeeper to the Marquis of Ailesbury, were also exhibited.

Entomology.

F. J. H. JENKINSON read a list of Notices.

T. R. DUMERGUE exhibited a pair of the new Silk-worm Moth, (*Attacus Cynthia*), with Cocoon and specimen of Silk.

H. M. HILTON exhibited *G. rubricollis*, *A. Degeerella*, *N. Lucina* and *A. Rubidata*, recently captured by him.

THE PRESIDENT exhibited a wasp's nest, entirely destroyed internally by the larvæ of *A. Colonella*.

Geology.

W. D. SMITH exhibited a series of Chalk, Greensand, and Oolite Fossils, from Savernake and Swindon.

THE PRESIDENT exhibited a mass of pins dug up from a garden in Kent; and some sand fused by lightning into the shape of a funnel.

P. G. MAITLAND exhibited a Madrepore from Devonshire, and Violet quartz coloured by Potassium.

Botany.

THE PRESIDENT passed round a list of Notices, and exhibited specimens of *Aira Caryophyllea* and *Carex hirta*, two species new to the College List, found by E. im Thurn and G. F. Ruck respectively.

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R. B. MAINWARING exhibited a Carved Gourd from British Guiana.

R. F. ISAACSON read a paper on White Ants, illustrated by a diagram, and a specimen of the Queen Termite, preserved in spirits.

There were 76 persons present.

MEETING HELD JUNE 21ST, 1867.

THE TREASURER read his report, showing an available balance of £4 6s. 6d.

Ornithology.

THE PRESIDENT exhibited the skull of an Albatross, from Formosa.

J. W. PARRINGTON exhibited a Cuckoo, which he also presented to the Society.

E. IM THURN exhibited a Woodcock shot in the neighbourhood.

Botany.

THE PRESIDENT read out a list of notices, among them two plants new to the College list; *Helosciadium inundatum*, found by J. W. Parrington, and *Torilis nodosa* by G. F. Ruck.

Zoology.

A. P. HOCKIN exhibited the rattle and teeth of a Rattle-snake.

E. IM THURN then read the following paper, illustrated by a very fine collection of specimens, on

BIRDS' NESTS.

I have chosen birds' nests as my subject for to-night, for several reasons; but I have found it rather a difficult one, as it is such a large subject that it would require at least a dozen papers to give a correct idea of the nesting habits of one single British bird. This being the case I have determined to point out the most interesting facts concerning those nests which seem to be most curious, either in position, material, or shape. A collection of nests, if it is a good one, is most interesting, especially if the eggs are preserved with them; in this way the eggs themselves are far more interesting than if they were merely arranged in little wooden partitions lined with white or pink cotton wool, as it gives one a much better idea of the eggs; besides showing the nest, which is almost as interesting, it is also much easier to identify the eggs with than without the nests. Foreign nests are perhaps more curious than English ones, but are in a great many instances inferior to ours in beauty, there are few nests of any country more beautiful than that of the Chaffinch, one of our commonest. The chief reason why foreign birds' nests

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are so much more admired, is more from the position in which they are placed than anything else, as they are not made so beautifully; but they are suspended in such curious positions, and so strongly, that it seems almost impossible that they are built by animals which have nothing but instinct, and that not very strong, to guide them By far the most curious of all is the Tailor Bird, which, having chosen two or more leaves, first drills holes all down the edges of them with its beak, and then actually sews the leaves together with the fibres of a certain plant so as to form a kind of pendent bag, in which it builds its nest. This nest belongs to a class of which we have but very few examples in England. They are called pendulous nests, the Golden-crested Wren being the chief, if not the only, British representative: but abroad in the Brazils, in Africa, and to some extent in Australia they abound, and are perhaps the most plentiful of all there, and it is curious that they are not more frequently sent over to England amongst the hundreds of birds' skins, and other objects of natural history which are annually brought into London and Liverpool. In the Brazils one of the most curious nests is that built by the Brazilian Wood Nymph, which is itself one of the brightest and prettiest coloured birds in existence. This nest is very small indeed, like those of most other humming birds, and is built of the down out of the pods of the silk-cotton tree, as it is called by the natives, interwoven with the most delicate kinds of lichen. But here again, its chief interest arises from the position in which it is built, as it is attached to the slenderest tendril of some creeper, which, having climbed up round the trunk of some tree, allows its tendrils to hang loosely down and blow about in the wind. It is on one of these tendrils generally, resting on two of the leaves, that the Wood Nymph builds its nest. Another bird of South America, the little Hermit Humming-bird, builds its nest, which in shape is not unlike that of our common House-martin, adhering to the end of some broad palm leaf, instead of the walls of a house. There are other Humming Birds in the same country which build nests of the same shape, only adhering to the ledge of some rock, thus resembling even more closely our common Martins.

In Africa the most curious nests are those built by the family of Weaver Birds, which all build domed nests, though they are of course various in shape. They are supported in some instances by means of long rope-like appendages formed by the birds themselves of the same material as the nest; and it is curious to notice how some nests, that of the Little Hermit amongst others, have this long rope hanging down from the bottom of the nest, without any object, that is without any object which has yet been found out by the closest observers of nature. Other Weaver Birds build soft round hollow balls, with a hole a little below the top, the materials of which are carefully woven round three or four neighbouring twigs. There is one bird in England which

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builds a nest somewhat similar to the latter kind of Weaver Birds; it is that of a bird very common in the forest, but whose nest curiously enough is not often found, the Long-tailed Tit, which, unlike most of our English Tits, does not build in the hole of some tree, but builds a domed nest supported in the same way as some of the Weaver Birds. The material is usually a small quantity of wool with a great deal of lichen. The entrance into the nest is so very small that one would think it almost impossible for a bird to get in. The bird itself is very curious, and seems almost more like a mouse than a bird, for one can well imagine all these downy feathers turned into fur. The specimen which I have here was procured in a garden not far from the College out of a juniper tree.

As to pendent nests there are very few English ones indeed besides that of the Gold-crest, but there are two birds which usually build near the water, and make what are generally called semipendent nests. These are the Sedge Warbler and the Reed Warbler; the former of which is still pretty common about here, and builds a very large nest, at least forms a large mass of material, but the real hollow for the eggs is very small in comparison; the latter, the Reed Warbler, I am told, used to be very common about here, but must now be reckoned almost one of our scarce birds. It builds a very pretty nest indeed, sometimes fastening it to three reeds, and sometimes building it in the fork of some low bush growing near the water.

So much for the pendent nests, but amongst domed nests the case is different; we have a good many English birds which build domed nests, the prettiest and cleverest built of which is that of the common wren. This nest is built generally against the side of a tree, or just under the thatch of a barn, sometimes buried in the side of a hay stack. It is usually built of the material best calculated to hide it from sight, and this is, I believe, the great reason why this bird is still so common everywhere, as though a great many nests are undoubtedly taken every year, still a great many are so well concealed that they escape notice, and the parents rear their young in safety. I have seen nests built of three distinct kinds of moss, of dead leaves, of dry ferns, and even of little pieces of straw. This bird has a curious habit of building nests very early in the year, which they never line. The fact of their never being lined forms the great distinction between these "Cocks' nests," as they are called, and the true ones, as the wren in building a nest in which to rear her young uses an immense amount of feathers. It is supposed that they build these cocks' nests to protect them from cold during the night; I believe that this is about the only bird known to build a nest merely for the sake of warmth. The Chiff-Chaff also builds a very beautiful domed nest, but usually on the ground, forming it of dry hay and fern, among which latter it is generally placed. There is one bird very common here, that builds a domed nest so very different from those

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that I have mentioned here that I cannot pass it over. I mean the Magpie, which builds a nest of enormous size in the top of some tree, occasionally, however, it builds in some tall bush, from which circumstance it has long been erroneously supposed that there are two different species of this bird, the bush Magpie and the tree Magpie. This is now, however, proved to be entirely without foundation. The nest is built of thorns and brambles, of which a tremendous amount are used, the longest and sharpest being always used for the dome, so that it is often a very painful operation to get one's hand into the nest.

Besides these classes of nests there are two others, both of them very plentiful in England. The largest of the two contains all the nests which are built in holes in the trees. The forest contains a great many different examples, the commonest of all amongst little birds being the different kinds of Tits which build in holes in the hollow thorn trees. They make a very flat nest, if it can indeed be called a nest, being merely a platform of moss, hair, and other materials on which to lay their eggs. Almost as common as the Tits in a certain part of the forest, that near the Braden Oak, are the Redstarts, which lay a pretty little blue egg in very much the same kind of hole as the Tits. Amongst larger birds we have the Jackdaws, which build in immense numbers here, generally in a hole high up in some beech tree; and almost more plentiful still are the Starlings. If any one were to walk slowly along the Grand Avenue he would get a very fair idea of our tree-building birds; he would see plenty of Jackdaws and Starlings, occasionally a Nuthatch or Tree-creeper, and now and then he would observe a very neat little round hole in which some bird has evidently built its nest, and from which would fly most probably a bird, which is fast becoming rare in England, but of which we still retain a good number, more, it is said, than in any other part of England. The Woodpecker usually makes a hole for itself, beginning where some bough, torn down by the wind, has left a hollow in the tree. The rain settling in this natural cavity gradually renders the wood softer and thus makes the Woodpecker's task very much easier. Being also in the habit of piercing the wood in search of its food, nature has provided this bird with a beak exactly fitted for the purpose. Inside this hole it lays its eggs on the soft chips of wood without making any nest at all. The diagram, which I have here, represents a section of the nest of the lesser spotted Woodpecker, presented by Mr. Gould to the British Museum. The common green Woodpecker makes its hollow exactly in the same way, only of course considerably larger in comparison.

The last class of nests contains those which are built on or in the ground. Amongst those which build in the ground are the Kingfishers, the only bird which at all equals foreign ones in its colours. It is pretty common here though its nest is well concealed and therefore not often taken. I have seen

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no less than nine Kingfishers in different parts of the river within the last few months, and from the fact that most of them were on the Og, I presume they are commoner there than on the Kennet, Very little, however, can be said in favour of the nest, notwithstanding the beauty of the bird. It is built in a hole in the ground, very often in a rat's hole, and as it is formed of fish bones which the bird has cast up, and which have a most horrible smell, a Kingfisher's nest is by no means pleasant to the nose. There has long been a story that the British Museum had offered £100 for a perfect specimen of a Kingfisher's nest; I myself believe this to be a perfect myth; one thing, however, is certain, the British Museum has now for several years possessed a good specimen of a Kingfisher's nest, procured and presented to it by the same Mr. Gould whose name I mentioned before in connection with the Woodpecker's nest. Another bird which builds in holes, the Sandmartin, excavates a hole for itself, for it breeds in large flocks; they used to be very abundant at Savernake, but I am informed that this year they have either entirely deserted the spot or else have changed their breeding place. Besides these there are several species of sea-birds, which build in holes in the ground, the Puffin, which usually breeds in deserted rabbit burrows, and the Stormy Petrel, which like the Sandmartins breeds in large flocks, excavating its own hole. There are a great many birds which build on the ground, the commonest, here at least, is the Pewit or Lapwing, which can scarcely be said to build a nest, but lays its eggs in a hollow in the ground. There are besides this several little birds which build on the ground, amongst others common here are the different kinds of Larks. In conclusion I have to mention one bird whose nesting habits are so peculiar that they still furnish naturalists with an endless subject for discussion, the Cuckoo, which as you must know builds no nest of its own, but lays its eggs and deposits them in the nests of some other birds, leaving the young to be reared by the true owners of the nests. The few nests on the table have all been collected in this neighbourhood during the last few weeks.

The following summary of proceedings was then read:—

	1867.	Corresponding half 1866.
Total number of Exhibitions... ...	157	154
Average number per meeting ...	17-7	15-4
Average number of persons present at the meetings	47-5	44
Average number of visitors	25-5	25

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ENTOMOLOGICAL NOTICES.

At the beginning of the season Lepidoptera were unusually forward, as may be seen by reference to some of the dates of species that hybernate, two of which, (*V. Urticæ* and *G. Rhamni*) were taken on the 15th of February; but, on the whole, the season cannot be called forward, as, since the beginning of May, scarcely anything has been earlier than last year; on the contrary, nearly all have been a week or more later.

In the following list, those marked thus (*) are new to the locality; those marked (H) were *hybernated* specimens.

Names of those whose initials occur in the List.

F. F. B.	F. F. Back.
F. J. C. B.	F. J. C. Boles.
H. E. B.	Rev. H. E. Booth.
C. F. B.	C. F. Braine.
C. M. B.	C. M. Bull, Esq.
G. W. C.	G. W. Creaton.
E. H. D.	E. H. Davis.
F. F.	F. Ffolkes.
H. G.	H. Glasse.
A. C. H.	A. C. Hilton.
H. M. H.	H. M. Hilton.
A. P. H.	A. P. Hockin.
G. H.	G. Holden.
R. F. I.	R. F. Isaacson.
F. J. H. J.	F. J. H. Jenkinson.
P. T. M.	P. T. Macquoid.
R. B. M.	R. B. Mainwaring.
H. M.	H. Manders.
J. W. P.	J. W. Parrington.
R. P.	R. Phayre.
G. P.	G. Podmore.
T. A. P.	Rev. T. A. Preston.
B. W. R.	B. W. Repton.
G. F. R.	G. F. Ruck.
M. H. S.	M. H. Smith.
E. im T.	E. im Thurn.
W. W.	W. Ward.
J. F. W.	J. F. Wilkinson.
F. J. W.	F. J. Wiggin.
L. H. Y.	L. H. Young.

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LEPIDOPTERA.

RHOPALOCERA.		Date.	Captor.
Gonepteryx Rhamni ...	Brimstone	Feb. 15.	
Colias Edusa	Clouded Yellow ...	H. May 29.	*J. W. P.*, seen.
Pieris Brassicæ	Large White ...	April 28.	*H. M. H.—A. C. H.*
P. Rapæ	Small White ...	April 3.	*F. J. H. J.—A. C. H.*
P. Napi	Green-veined White	May 3.	*F. J. H. J.—H. M. H.*
Anthocharis Cardamines	Orange Tip	May 2.	*G. P.*
Lasiommata Ægeria ...	Speckled Wood ...	April 29.	*A. P. H.*
L. Megæra	Wall	May 29.	*F. J. H. J.*
Hipparchia Janira	Meadow Brown ...	June 22.	*F. J. H. J.—H. M.—F. J. C. B.*
H. Tithonus	Gate-keeper ...	Not by June 26.	
Cœnonympha Pamphilus	Small Heath ...	May 28.	*A. C. H.*
Cynthia Cardui	Painted Lady ...	H. May 8.	*F. J. H. J.—A. C. H.—H. M. H.*
Vanessa Atalanta	Red Admiral ...	H. April 3	*R. F. I.*
V. Io	Peacock	H. April 2.	*C. M. B.*
V. Polychloros	Large Tortoise-shell	May 1.	*J. F. W.*
V. Urticæ	Small Tortoise-Shell	H. Feb. 15.	*G. H.*
Argynnis Selene	Small Pearl-bordered Fritillary	June 9.	*A. C. H.*
A. Euphrosyne	Pearl bordered Fritillary... ...	May 29.	*C. F. B.—F. J. H. J. H. M. H.—P. T. M.*
Melitæa Artemis	Greasy Fritillary	June 10.	*F. J. C. B.*
Nemeobius Lucina... ...	Duke of Burgundy	June 9.	*A. C. H.*
Chrysophanus Phlœas ...	Small Copper ...	May 16.	*J. W. P.*
Polyommatus Alsus ...	Bedford Blue ...	June 10.	*F. J. H. J.—F. J. C. B. H. M. H.—A. C. H.*
P. Alexis	Common Blue ...	June 22.	*F. J. H. J.—H. M.*
P. Agestis	Brown Argus ...	June 10.	*C. F. B.*
Thymele Alveolus	Grizzly Skipper ...	May 8.	*A. C. H.*
Thanaos Tages	Dingy Skipper ...	May 18.	*F. J. H. J.—J. W. P.*
Pamphila Sylvanus ...	Large Skipper ...	June 10.	*F. J. C. B.—B. W. R.*
HETEROCERA.	SPHINGINA.		
Procris Statices	Green Forester ...	June 9.	*F. J. H. J.—H. M. H.*
Smerinthus Ocellatus ...	Eyed Hawk-moth	May 29.	Bred *T. A. P.*
S. Tiliæ	Lime Hawk-moth	April 12.	Bred.

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		Date.	Captor.
Sphinx Ligustri	Privet Hawk-moth	June 8.	Bred *T. A. P.*
Chærocampa Elpenor ...	Elephant do. ...	June 15.	*F. F.*
Macroglossa Stellatarum	Humming-bird H.	May 8.	*F. J. H. J.*
	BOMBYCINA.		
* Hepialus Hectus... ...	Golden Swift ...	June 16.	*F.J.H.J.—F.J.C.B. —H. M. H.*
H. Lupulinus	Common Swift ...	June 5.	*M. H. S.*
H. Humuli	Ghost	June 18.	*G. W. C.*
Dasychira Pudibunda ...	Pale Tussock ...	June 10.	*J. W. P.*
Gnophria Rubricollis ...	Red-necked... ...	June 10.	*F.J.H.J.—A. C.H. H. M. H.*
Nudaria Mundana		June 24.	*F. J. H. J.*
Euthemonia Russula ...	Clouded Buff ...	June 13.	*F. J. W.*
Nemeophila Plantaginis	Wood Tiger... ...	June 10.	*B. W. R.*
Spilosoma Menthasti ...	White Ermine ...	May 11.	*R. P.*
S. Lubricepeda	Buff Ermine ...	May 31.	*R. B. M.*
Diaphora Mendica	Muslin...	May 19.	*F. J. C. B.*
Callimorpha Jacobææ ...	Cinnabar	June 13.	*F. J. H. J.*
Drepana Falcataria ...	Beautiful Hooktip	May 10.	*F. J. H. J.*
D. Hamula	Pebble Hooktip ...	June 11.	*A. C. H.*
D. Unguicula		May 7.	*H. G.*
	NOCTUINA.		
Mamestra Brassicæ		June 9.	*F. J. C. B.*
* Miana Strigilis		June 22.	*F. J. H. J.*
Grammesia Trilinea		June 9.	*F. J. H. J.*
Triphœna Pronuba		June 14.	Churchill.
* Noctua Brunnea		June 3 (?)	*R. B. M.*
Tæniocampa Gothica...		Feb. 26.	*F. J. H. J.*
T. Instabilis		April 6.	*F. F. B.*
* Hadena Dentina		June 15.	*A. C. H.*
Phlogophora Meticulosa		May 18.	*F. J. C. B.*
Abrostola Urticæ		June 23	*H. E. B.*
Plusia Gamma		May 11.	*F. J. H. J.*
Euclida Mi		May 18.	*L. H. Y.*
Phytometra Ænea		June 8.	*A. C. H.*
	GEOMETRINA.		
Rumia Cratægata		May 6.	*R. P.*
Selenia Illunaria		April 12.	*H. M. H.*
Amphidasis Prodromaria		April 2.	*F. F. B.*
Hemerophila Abruptaria		May 3.	*E. H. D.*

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	Date.	Captor.
Iodis Lactearia	May 29.	*F.J.H.J.—H.M.H.*
Ephyra Punctaria	June 11.	*F. J. H. J.*
Cabera Pusaria	May 23.	*F. J. C. B.*
Corycia Punctata	May 4.	*F. J. H. J.*
C. Taminata	May 13.	*F. J. H. J.*
Lozogramma Petraria	May 7.	*H. G.*
Fidonia Atomaria	May 30.	*J. W. P.*
Minoa Euphorbiata	May 31.	*F. J. H. J.*
Ligdia Adustata	June 22.	*F. J. H. J.*
Lomaspilis Marginata	May 8.	*A.C.H.*
Hibernia Rupicapraria	Feb. 5.	*C. M. B.*
Emmelesia Alchemillata	June 10.	*F. J. H. J.*
Larentia Miaria	May 28.	*F.J.H.J.—A.C.H.*
* Eupithecia Venosata	June 22.	*F. J. H. J.*
* E. Castigata	May 28.	*F. J. H. J.*
Melanthia Ocellata	May 11.	*F. J.H.J.—A.C.H.*
Melanippe Biriviata	May 7.	*F. J. H. J.*
M. Montanata	May 26.	*A. C. H.—W. W.*
M. Fluctuata	April 28.	*T. A. P.*
Anticlea Derivata	... About May 6.	*A. C. H.*
* A. Rubidata	June 9.	*F. J. H. J.*
Coremia Propugnata	May 28.	*F. J. H. J.*
C. Ferrugaria	May 4.	*A. C. H.*
Camptogramma Bilineata...	June 14.	*A.C.H.—F.J.H.J.*
Scotosia Dubitata	May 12.	*F. J. H. J.*
Cidaria Corylata...	June 8.	*F. J. H. J.*
C. Russata	May 31.	*A. C. H.*
Odezia Chœrophyllata	June 8.	*M. H. S.*
PYRALIDINA.		
Hypena Proboscidalis	June 20.	*F. J. H. J.*
Pyrausta Ostrinalis	June 10.	*F. J. H. J.*
Herbula Cespitalis	May 6.	*A. C. H.—H. M. H.*
* Hydrocampa Nymphæata	June 21.	*M. H. S.*
Botys Pandalis	June 15.	*F. J. H. J.*
B. Fuscalis	June 11.	*H. M. H.*
B. Urticata...	June 8.	*F. J. H. J.*
Scopula Olivalis...	June 22.	*F. J. C. B.*
* Stenopteryx Hybridalis...	May 6.	*A. C. H.—H. M. H.*
Simæthis Fabriciana	May 6.	*A. C. H.—H. M. H*
* Eudorea Angustea...	Feb. 23. H.	*A. C. H.*

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	Date.	Captor.
E. Pyralella...	June 3.	*F. J. H. J.*
Crambus Pascuellus	June 9.	*F.J.H.J.—H.M.H.*
C. Hortuellus	June 22.	
PTEROPHORINA.		
Pterophorus Pterodactylus		*H. M. H.*
* P. Microdactylus	June 20.	*F. J. H. J.*
P. Galactodactylus ... ... Pupæ taken.	June 15.	
Alucita Polydactyla	June 20.	*T. A. P.*

BOTANICAL NOTICES.

As usual "By" indicates that the plant had apparently been in flower a day or two before discovered; and an asterisk (*) that the specimen observed was a cultivated one.

Names of those whose initials appear in the following List:—

M. O. A.	M. O. Alison
H. R. A.	H. R. Armstrong.
F. F. B.	F. F. Back.
C. St. J. B.	C. St. J. Beauclerk.
H. E. B.	Rev. H. E. Booth.
C. M. B.	C. M. Bull, Esq.
L. C. C.	L. C. Calley.
S. W. C.	S. W. Cameron.
E. H. C.	E. H. Carr.
S. F. C.	S. F. Chichester.
T. W. D.	T. W. Davies.
H. S. D.	H. S. Dickinson.
T. D.....	T. Dudding.
W. F.	W. Fergus, Esq., M.D.
C. R. F.	C. R. Few.
R. M. B. G.....	R. M. B. Glasse.
G. G.	G. Gurney.
F. W. H.	F. W. Head.
A. H.	A. Herklots.
J. E. H.	J. E. Hilliard.
A. C. H.	A. C. Hilton.

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H. M. H.	H. M. Hilton.
A. P. H.	A. P. Hockin.
F. J. H. J.	F. J. H. Jenkinson.
J. H. J.	J. H. Johnson.
L. C. L.	L. C. Leach.
F. E. L.	F. E. Lear.
G. A. L.	G. A. Lefroy.
J. A. L.	J. A. Lefroy.
T. L.	T. Lister.
T. E. M.	T. E. Maclean.
P. T. M.	P. T. Macquoid.
F. P. M.	F. P. Mansfield.
W. E. M.	W. E. Mullins, Esq.
J. C. P.	J. C. Palmer.
J. W. P.	J. W. Parrington.
R. P.	R. Phayre.
G. P.	G. Podmore.
J. J. P.	Rev. J. J. Pulleine.
W. D. P.	W. D. Pulling.
B. W. R.	B. W. Repton.
A. H. B. R.	A. H. B. Reynardson.
G. F. R.	G. F. Ruck.
R. A. S.	R. A. Simpson.
H. T. S.	H. T. Stainton, Esq., F.R.S.
E. im T.	E. im Thurn.
P. T.	P. Thursby.
T. T.	T. Tilleard.
L. H. Y.	L. H. Young.

		1867.	1866.	
Thaliotrum flavum	Meadow Rue	Bud June 21	...	E. im T.
Anemone nemorosa ...	Wood Anemone ..	Feb. 20	March 18	H. E. B.
appennina ...	Blue Anemone ...	By April 12	April 1	...
*pulsatilla ...	Pasque Flower ...	May 7	...	...
*hepatica ...	Hepatica blue ...	Feb. 7	...	W. F.
	,, red	Feb. 9	...	W. F.
Ranunculus heterophyllus	Water Crowfoot...	April 19	April 18	H. M. H.

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		1867.	1866.	
peltatus	Ditto	Full fl. My. 15	Before May 1	H. M. H.
ficaria	Lesser Celandine	Feb. 9	Feb. 10	G. F. R.
auricomus ...	Goldilocks	April 19	April 16	G. F. R. & J. W. P.
acris.....	Upright Crowfoot	April 23	May 9	
repens	Creeping ditto ...	April 29	March 17 May 3	G. F. R. & J. W. P
bulbosus	Buttercup	April 17	April 17	S. F. C.
arvensis	Corn Crowfoot ...	By June 10	May 3	J. C. P.
Caltha				
* palustris ...	Marsh Marigold...	Feb. 27	March 21	E. im T. & J. C. P.
Trollius				
Europæus ...	Globe Flower.....	May 7	May 22	...
Eranthis				
* hyemalis ...	Winter Aconite ...	Feb. 1	going off Feb. 10	...
Helleborus				
viridis	Green Hellebore	By April 3	full fl. Apl. 18	Mrs. Blake
Aquilegia				
* vulgaris ...	Columbine	May 7	By May 12	...
Berberis				
vulgaris	Berberry	May 13	Bud May 13	G. F. R. & J. W. P.
* fascicularis		March 27	March 18	F. P. M. & T. W. D.
Papaver				
rhœas	Common Poppy...	June 16	May 30	H. T. S.
Meconopsis				
* cambrica ...	Yellow Poppy ...	May 9	May 7	
Chelidonium				
majus	Greater Celandine	May 7	May 1	T. L.
Corydalis				
* solida	Solid Corydal.....	March 16	March 29	
* tuberosa ...	Hollow Corydal...	Full fl. Apl. 16		
Fumaria				
officinalis.....	Fumitory	By May 26	April 26	B. W. R.
Dielytra				
* spectabilis	Bleeding Heart ...	April 29	April 26	
Cheiranthus				
* cheiri	Wallflower	April 7	Feb. 10 April 10	

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		1867.	1866.	
Nasturtium				
officinale	Watercress	June 5	June 6	J. W. P.
Barbarea				
vulgaris	Yellow Rocket ...	May 10	May 16	J. W. P. & G. F. R.
Arabis				
hirsuta.....	Hairy Rock Cress	April 25	April 12	J. C. P. & E. im T.
Cardamine				
hirsuta.....	Hairy Bitter Cress	By Feb. 19	By Feb. 10	
pratensis	Cuckoo Flower ...	April 18	April 22	R. M. B. G. & T. T.
Sisymbrium				
officinale	Hedge Mustard ...	June 18	June 10	J. W. P.
Alliaria				
officinalis.....	Garlick Hedge Mustard	April 23	April 23	J. W. P.
Brassica				
campestris ...	Navew.....	April 19	Feb. 17	J. C. P.
Lunaria				
* biennis	Honesty	April 19	April 13	
Sinapis				
arvensis.....	Charlock	May 6	April 25	A. C. H. & H. M. H.
Aubrietia				
*		April 1		
Draba				
verna	Whitlow-grass ...	March 4	Fl. & seed Mar. 10	H. S. D. & T. D.
Armoracia				
* rusticana ...	Horse Radish.....	June 5	...	J. W. P.
Lepidium				
campestre ...	Pepper-wort	April 21	Bud Apl. 30	J. C. P. & E. im T.
Capsella				
bursa-pastoris	Shepherd's Purse	Feb. 14 March 31	April 16	T. E. M. E. im T.
Isatis				
* tinctoria ...	Woad	May 8	May 7	
Reseda				
lutea.....	Wild Mignonette	By June 10	June 9	H. M. H.
Helianthemum				
vulgare	Rock Rose	June 3	May 22	F. W. H.

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		1867.	1866.	
Viola				
odorata.....	Sweet Violet	Feb. 23	Feb. 28	F. F. B.
hirta.....	Hairy Violet	April 6	March 23	
Reichenbachiana	Wood Violet	Full fl. Apl 17	April 11	
Riviniana.....	Ditto	April 8	April 11	Mrs. Blake
tricolor.....	Pansy	Full fl. Apl. 21	May 25	J. C. P. & E. im T.
(var) arvensis	Ditto	March 29	April 17	F. J. H. J.
Polygala				
vulgaris	Milkwort	May 4	May 7	E. im T.
Dianthus				
* cæsius ...	Cheddar Pink ...	June 6	June 9	E. im T.
Silene				
inflata	Bladder Campion	June 10	June 4	
Lychnis				
flos-cuculi ...	Ragged Robin ...	May 23	By June 7	J.W.P.&A.H.
vespertina ...	White Campion...	May 16	May 28	J. C. P. & E. im T.
diurna	Red Campion.....	May 4	May 8	E. im T.
Sagina				
procumbens...	Pearl-wort	May 11		G. F. R.
Arenaria				
trinervis	Sand-wort	May 3	April 30	A. C. H. & H. M. H.
serpyllifolia...	Thyme-leaved do.	Fl. & seed June 22	May 26	E. im T.
Stellaria				
media	Chickweed	By Feb. 11	Feb. 18	J. J. P.
Holostea	Greater Stitchwort	April 19	April 12	G. F. R. & J. W. P.
graminea	Grassy ditto	June 15	Full fl. Ju. 23	A. P. H. & H. W. H.
Cerastium				
glomeratum	Mouse-ear Chickweed	March 29	April 16	J. W. P.
Malva				
sylvestris ...	Mallow	June 9	June 19	H. M. H.
rotundifolia...	Dwarf ditto	June 9		P. T.
Tilia				
parvifolia.....	Lime Tree	not by Ju. 26		
Hypericum				
* calycinum		Bud June 16		E. im T.

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		1867.	1866.	
perforatum ...	St. John's Wort...	Full budJu.19	Not by Jly.1	J. W. P. & G. F. R.
Acer				
campestre ...	Field Maple	April 28	May 6	E. im T.
Pseudo-platanus	Sycamore	May 3	April 27	G. F. R. & J. W. P.
Æsculus				
Hippocastanum	Horse Chestnut...	April 27	May 5	J. W. P.
Geranium				
*Phæum	Dusky Crane's-Bill	May 4	May 12	
*sylvaticum	Wood ditto	May 14	By May 31	
pratense	Meadow ditto.....	May 29	June 13	M. O. A.
*Sanguineum	Bloody ditto	June 20	June 9	
dissectum ...	Cut-leaved ditto...	By June 2	May 29	J. C. P. & E. im T.
rotundifolium	Round-leaved do.	By June 6	May 12	
molle	Dove's Foot	May 1	April 28	J. C. P. & E. im T.
lucidum ...	Shining Crane's-Bill	May 3	May 2	G. F. R.
Robertianum	Herb Robert	May 1	April 30	A. C. H. & H. M. H.
Linum				
Catharticum	Purging Flax	May 18	Full fl.June13	J. W.P.&G.F. R.
Oxalis				
acetosella ...	Wood Sorrel	April 13	Full fl. Ap. 23	J. C. P.
Euonymus				
Europeus ...	Spindle	May 19	May 29	G. F. R.
Staphyllea				
*pinnata ...	Bladder-nut	by May 4	May 8	
Rhamnus				
catharticus ...	Buckthorn	June 3		F. W. H.
Ulex				
Europeus ...	Furze	Feb. 11	by Feb. 25	
Genista				
Anglica	Petty Whin	just outMay18	...	J. J. .P
Sarothamnus				
scoparius ...	Broom	May 23	full fl. May 5	H. M. H.
Medicago				
lupulina	Black Medick.....	May 6	May 1	H.M.H. & A. C. H.

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		1867.	1866.	
Trifolium				
pratense	Purple Clover.....	May 8	April 30	E. im T.
repens	Dutch Clover	May 15	May 23	G. F. R.
minus	Lesser Hop Trefoil	May 15	by May 23	J. J. P.
* incarnatum	Scarlet clover ...	nearly out May 29		J. W. P.
Lotus				
corniculatus	Bird's Foot	nearly out May 16		J. C. P. & E. im T.
Anthyllis				
vulneraria ...	Ladies' Fingers ...	May 15	May 21	J.W.P.& A.H.
Vicia				
hirsuta	Hairy Tare	May 23	fl. & seed June 3	G. F. R.
tetrasperma	Slender Tare	by June 12		H. M. H.
sylvatica	Wood Vetch	June 10		J. C. P.
sepium	Bush Vetch.....	May 5	April 27	A. H. B. R.
sativa	Common Vetch ...	June 1		J. W. P.
Lathyrus				
pratensis	Everlasting Tare	June 10		E. im T.
macrorhizus	Tuberous Vetch...	April 22	April 24	A.C.H.&H.M.H.
Hippocrepis				
comosa	Horse-shoe Vetch	May 29	May 29	J.W.P.&L.H.Y
Onobrychis				
sativa	Cock's Head	May 31	May 28	G. F. R.
Cytisus				
*Laburnum	Laburnum	May 8	May 15	E. im T.
Prunus				
spinosa	Sloe	April 7	April 8	W.D.P.; J.W. P.&G.F.R.
insititia	Bullace	April 8	March 28	G. F. R. & E. im T.
domestica	Wild Plum	April 17		E. im T.
Avium	Cherry Tree	April 19	April 18	J. J. P.
*Padus	Bird Cherry	May 8	...	
Spiræa				
ulmaria	Meadow Sweet ...	June 23		J. W. P.
Sanguisorba				
officinalis ...	Great Burnet	bud Ap. 28		J. W. P. and G. F. R.

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		1867.	1866.	
Poterium				
Sanguisorba	Small Burnet ...	May 9	May 3	J. W. P. and G. F. R.
Agrimonia				
eupatoria ...	Agrimony	bud June 10		J. W. P.
Alchemilla				
vulgaris	Lady's Mantle ...	May 1	May 5	A. C. H. and H. M. H.
arvensis	Parsley Piert	April 11	March 17	J. W. P. and G. F. R.
Sibbaldia				
*procumbens	Sibbaldia.....	May 9	May 3	
Potentilla				
anserina	Silver-weed.....	May 16	May 21	J. C. P. and E. im T.
Tormentilla..	Tormentil	May 8	May 9	J. C. P.
fragariastrum	Barren Strawberry	Feb. 14	Feb. 17	H. M. H.; T. E. M. & E. im T.
Fragaria				
vesca	Strawberry	April 17	April 25	
Rubus				
Idæus	Raspberry	bud Ap. 21	May 10	G. F. R.
cæsius	Dewberry	May 18	June 1	G. F. R. and J. W. P.
"	Bramble	June 15		A. P. H.
Geum				
urbanum ...	Avens	April 26	by May 4	
rivale	Water Avens	April 12	April 1	
Rosa				
canina	Dog Rose.....	June 1	...	J. W. P. and L. H. Y.
Crataegus				
oxyacantha	Hawthorn	May 7	May 14	J. W. P.
Pyrus				
malus	Crab Apple.....	May 7	May 9	J. W. P.
*aucuparia ...	Mountain Ash.....	May 7	May 20	J. W. P. and G. F. R.
*Japonica		April 1	Feb. 10	
"	Apple	April 28	April 27	H. E. B.

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		1867.	1866.	
*	Apricot	March 31	March 31	H. E. B.
*	Damson	April 21		J. W. P.
*	Peach	March 27	March 21	H. E. B.
*	Pear.....	Ap. 7, Ap. 21	April 20	T.D.; H.E.B.
*	Plum	March 31	April 1	H. E. B.
Epilobium				
montanum ...	Broad Willow Herb	June 14		
Montia				
fontana	Water Blinks	full fl. May 18	seed May 23	
Bryonia				
dioica	Red-berried Bryony	June 7		J. W. P.
Sedum				
*Rhodiola ...	Rose-root	May 4	May 7	
acre	Wall-pepper	June 15		J. W. P. and G. F. R.
Ribes				
grossularia ...	Gooseberry	April 7	April 1	J. W. P. and G. F. R.
rubrum	Red Currant	by April 8	April 9-14	W. D. P.
*sanguineum	Scarlet Ribes	March 29	April 1-8	
aureum	Golden ditto	April 26	by April 18	J. W. P. and E. H. C.
Saxifraga				
*hirsuta	Hairy Saxifrage...	May 7	...	
tridactylites	Rue-leaved ditto	April 11	April 12	G. F. R. & J. W. P.
granulata ...	Meadow ditto	May 4	May 8	E. im T.
Philadelphus				
*Coronarius...	Syringa	June 8		J. W. P.
Sanicula				
Europæa ...	Sanicle.....	May 9	May 7	J. W. P. and G. F. R.
Helosciadium				
inundatum ...	Least Marsh-wort	by June 20		J. W. P and L. H. Y.
Ægopodium				
podagraria ...	Goutweed	June 5		J. W. P.
Bunium				
flexuosum ...	Pignut	May 23	May 22	J. C. P. and E. im T.
Œnanthe				
crocata ...	Water Dropwort	just in fl. June 8		H. M. H.

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		1867.	1866.	
Æthusa				
cynapium ...	Fool's Parsley ...	May 25	...	J. C. P.
Meum				
*Athamanticum	Bald-Money	May 20	...	
Angelica				
sylvestris ...	Wild Angelica ...	bud May 16	...	E. im. T. & J. C. P.
Heracleum				
sphondylium	Hogweed	May 11	June 4	G. F. R.
Daucus				
carota	Carrot	June 16	...	E. im T.
Torilis				
Anthriscus ...	Hedge Parsley ...	bud June 14	...	G. F. R.
nodosa	Knotted ditto.....	by June 18		J. W. P. & G. F. R.
Scandix				
pecten	Venus' Comb	April 23	May 9	E. im. T.
Anthriscus				
sylvestris ...	Wild Chervil	April 13	April 13	E. im T.
Chærophyllum				
temulum ...	Rough Chervil ...	May 25	bud June 11	E. im T.
Conium				
maculatum ...	Hemlock	bud June 6		J. W. P. & G. F. R.
Adoxa				
moschatellina	Moschatel	March 9	March 30	F. J. H. J.
Cornus				
sanguinea ...	Dogwood.....	June 16		H. T. S.
* mascula ...	Cornel Cherry ...	Feb. 22.	by Feb. 22	
Sambucus				
nigra	Elder	May 23	June 2	E. im T. & J. C. P.
Viburnum				
lantana	Wayfaring Tree ...	May 4	May 5	E. im T.
opulus	Guelder Rose	* June 1 June 8		
Lonicera				
* caprifolium	Perfoliate Honeysuckle	May 11	May 20	T. L.
Periclymenum	Honeysuckle	June 15		F. J. H. J.
* pyrenaica		April 28		H. E. B.
Symphoricarpos				
* racemosus	Snowberry	June 4		E. im. T.

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		1867.	1866.	
Sherardia				
arvensis	Blue Sherardia ...	May 15	May 4	G. F. R.
Asperula				
cynanchica ...	Quinancy-wort ...	full bud June 18		G. F. R.
odorata	Sweet Woodruff...	May 4	May 7	
Galium				
cruciatum ...	Cross-wort	May 10	April 27	E. im T. & J. C. P.
aparine	Cleavers	May 9	May 10	G. F. R. & J. W. P.
mollugo	Bastard Madder...	June 14		
verum	Yellow Bedstraw	bud June 15		E. im T.
saxatile	Heath do.	bud May 27		J. C. P.
Centranthus				
*ruber	Spur Valerian ...	May 25	May 23	E. im T.
Valeriana				
officinalis ...	Valerian	full bud June 8		
dioica	Marsh do.	May 8 Ramsbury May 11 (Marlboro)	May 3	J. W. P. & L. H. Y. E. im T. & J. C. P.
Valerianella				
olitoria	Corn Salad	March 23	April 27	
Knautia				
arvensis	Field Scabious	...June 15		
Scabiosa				
columbaria ...	Small do.	June 20		J. W. P. and L. H. Y.
Petasites				
vulgaris	Butter-bur	Feb. 28	March 9	F. F. B.
Tussilago				
farfara.....	Coltsfoot.....	Feb. 11	Feb. 23	J. J. P.
Achillea				
millefolium...	Yarrow	June 14		
Anthemis				
arvensis	Corn Chamomile	by June 7		J. W. P.
Chrysanthemum				
leucanthemum	Ox-Eye	May 16	May 20	E. im T. and J. C. P.
Doronicum				
*pardalianches	Leopard's-bane...	May 4	May 2	

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		1867.	1866.	
Senecio				
aquaticus ...	Marsh Ragwort...	June 16		G. F. R.
campestris ...	Field Fleawort ...	full bud May 13	bud May 21	J. J. P.
Centaurea				
scabiosa	Greater Knapweed	bud June 10		J. W. P.
Carduus				
nutans.....	Musk Thistle	June 8		E. im T.
crispus.....	Welted Thistle ...	May 26	May 21	J. W. P. and G. F. R.
palustris	Marsh do.	June 15		E. im T.
Lapsana				
communis ...	Nipplewort.....	June 24		E. im T.
Hypochœris				
radicata	Long-rooted Cat's-ear	June 16		E. im T.
Apargia				
hispida	Rough Hawkbit...	June 2		J. C. P. and E. im T.
Tragopogon				
minor	Goat's-beard	by June 7		J. C. P.
Leontodon				
taraxacum ...	Dandelion	Feb. 7	Feb. 17	
Sonchus				
asper	Sowthistle	June 7		J. W. P.
Crepis				
virens	Smooth Hawksbeard	June 7		J. C. P.
biennis.....	Rough do.	by June 10		J. C. P.
Hieracium				
pilosella	Mouse-ear-Hawkweed	June 8		E. im T.
Campanula				
* glomerata	Clustered Bell Flower.....	June 4		E. im T.
Ilex				
aquifolium ...	Holly	May 11	May 24	J. C. P. and E. im T.
Ligustrum				
vulgare	Privet	bud June 16		J. W. P.
Fraxinus				
excelsior	Ash	April 28	by April 25	H. R. A.
Syringa				
*vulgaris.....	Lilac	May 3	May 7	J. W. P. and G. F. R.

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		1867.	1866.	
*persica	Persian Lilac	May 6		J. W. P.
Vinca minor	Periwinkle	* Feb. 6	{in flower March 3	
Gentiana amarella.....	Felwort	June 9		H. M. H.
* acaulis	Stemless Gentian	April 12	by April 3.	
Menyanthes trifoliata.....	Buckbean	by May 7	by June 6	C. St. J. B.
Cynoglossum officinale.....	Hound's Tongue	May 29	June 6	H. M. H.
Symphytum officinale ...	Comfrey	April 29	April 28	J. J. P.
asperrimum...		by May 30		E. im T. and J. C. P.
Pulmonaria * officinalis...	Lungwort	{full flower April 23	April 8	
Lithospermum arvense	Groundsell	May 9	April 23	A. P. H. and J. E. H.
Myosotis arvensis	Field Scorpion-grass	May 6	April 16	H. M. H. and A. C. H.
collina	Early Scorpion-grass	April 14	by April 23	G. F. R.
versicolor ...	Yellow & blue do.	by May 19	fl. & seed May 22	G. F. R.
Solanum Dulcamara ...	Bitter-sweet	June 8		J. C. Boles
Atropa *Belladonna	Deadly Nightshade	May 28	June 9	
Orobanche minor	Lesser Broom-rape	June 14		H. T. S.
Lathræa Squamaria ...	Toothwort	April 10	March 30	B. W. R. and S. F. C.
Digitalis *purpurea ...	Foxglove.....	June 21		
Linaria Cymbalaria...	Ivy-leaved Toadflax	May 8	April 26	E. im T.
Scrophularia nodosa.....	Knotted Figwort	June 1		P. T. M.
*vernalis.....	Yellow ditto	April 1	April 1	

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		1867.	1866.	
Melampyrum				
pratense	Cow-wheat	June 7		Mrs. Blake
Pedicularis				
sylvatica	Red Rattle	fully out May 6	April 30	G.P.&R.A.S
palustris	Marsh ditto	by June 20		J.C.P.&G.G.
Rhinanthus				
Crista-galli ...	Yellow-rattle	May 26	May 26	J. W. P. and G. F. R.
Veronica				
Beccabunga	Brooklime	May 27	June 6	G. F. R.
Chamædrys	Germander Speedwell	March 31 May 14	April 28	E. im T.
Serpyllifolia	Thyme-leaved do.	full flower May 6	May 7	Westmacott and Wood
arvensis	Wall ditto	April 23	May 15	J. C. P. and E. im T.
Buxbaumii ...	Buxbaum's ditto	seed Feb. 11, fl. April 7	Feb. 21	G. F. R. & J. W. P.
hederifolia ...	Ivy-leaved ditto	Feb. 14	Feb. 20	T. E. M. & H. M. H.
Thymus				
serpyllum ...	Wild Thyme	May 29	June 4	J. W. P. & L. H. Y.
Nepeta				
Glechoma ...	Ground Ivy	bud Mar. 26	Mar. 24	E. im T.
Lamium				
purpureum ..	Red Dead-nettle	Feb. 9	all the year	M. O. A.
album	White ditto... ...	Feb. 17	Feb.26,Ap.1	F. F. B.
*maculatum	Spotted ditto ...	by April 18	by April 1	
Galeobdolon	Archangel	April 27	April 30	J. J. P.
Stachys				
sylvatica	Hedge Woundwort	June 14		G. F. R.
Ballota				
fœtida	Horehound	bud June 16		G. F. R.
Ajuga				
reptans	Bugle	May 4	May 5	E. im T.
Primula				
vulgaris	Primrose.....	by Feb. 11	a few in Feb.	M. O. A.
veris.....	Cowslip	March 30	April 5	C. M. B.
Lysimachia				
nemorum	Wood Pimpernel	May 4		J. J. P.

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		1867.	1866.	
Dodecatheon				
*meadea.....	American Cowslip	May 1		
Plantago				
lanceolata ...	Ribwort	April 28	April 23	G. F. R. & J. W. P.
media	Lamb's Tongue ...	bud May 15		G. F. R.
major	Waybread	bud June 19		E. im T.
Rumex				
conglomeratus	Sharp Dock	not nearly out Ju. 14		
obtusifolius	Broad-leaved ditto	not quite out Ju. 15		
crispus	Curled ditto...	barely out June 14		
acetosa.....	Common Sorrel ...	May 25	April 30	E. im T.
acetosella	Sheep's Sorrel ...	June 10		
Polygonum				
Bistorta	Snakeweed	about May 19		R. P.
Daphne				
*mezereum	Common Mezereum	Feb. 6	in fl. Apl. 12	
Laureola.....	Spurge Laurel ...	Feb. 25		
Asarum				
*Europæum	Asarabacca.....	April 1	April 1	
Buxus				
sempervirens	Box	April 1	March 25	
Euphorbia				
amygdaloides	Wood Spurge.....	April 26	April 30	J. C. P. & E. im T.
Mercurialis				
perennis	Dog's Mercury ...	barren Feb. 15, fertile Feb. 22	Feb. 18 Feb. 26	T. E. M. & S. W. C.
Urtica				
urens	small Nettle	bud May 7		G. F. R.
dioica	common Nettle ...	June 10		
Ulmus				
suberosa	common Elm	March 31	seed April 27	E. im T.
montana	Wych Elm	March 26	March 3	
Salix				
caprea	Great Sallow	barren Feb. 25 fertile Mar. 5	March 11	R.C.L.; R.P.; R.M.B.G.

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		1867.	1866.	
Populus				
nigra	Black Poplar	Feb. 17	April 18	J. W. P. & E. im T.
fastigiata.....	Lombardy ditto ...	leaf May 4		J. W. P. & G. F. R.
Betula				
glutinosa.....	Birch	April 17	May 2	E. im T.
Fagus				
sylvatica.....	Beech	leaf April 25		J. C. P. & E. im T.
Castanea				
vulgaris	Sweet Chestnut...	leaf May 20		J. W. P.
Quercus				
Robur	Oak	May 6	nearly out May 2	J. C. P. & E. im T.
		fertile May 9		J. W. P. & G. F. R.
Corylus				
avellana	Hazel	barren Feb. 9	Feb. 12	M. O. A.
		fertile Feb. 15	Feb. 21	M. O. A.
Juglans				
regia	Walnut	fertile open, barren unopened My. 20	May 1	J. W. P.
Carpinus				
Betulus	Hornbeam	April 9	by May 7	E. im T.
Taxus				
baccata	Yew.....	Feb. 22	Feb. 21	
Pinus				
sylvestris	Scotch Fir	just in bud April 23		J. W. P.
Larix				
Europæa.....	Larch	barren Mar. 29 fertile Apl. 3	by April 1	J. W. P. & E. im T.
Paris				
* quadrifolia	Herb Paris	April 30	May 2	
Tamus				
communis ...	Black Bryony.....	June 13		H. M. H.
Orchis				
morio	Green-Winged Orchis	May 6	May 5	J. C. P.; E. im T.; H. M. H.

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		1867.	1866.	
mascula	Early Purple Orchis	April 19	April 24	F. E. L.
ustulata	Dwarf ditto.....	May 29	May 29	J. W. P.
maculata.....	Spotted Hand do.	*June 7		H. M. H.
		June 11		
latifolia	Marsh ditto	by June 20		J.C.P.&G.G.
Gymnadenia				
conopsea.....	Fragrant ditto ...	June 18		G. F. B.
Habenaria				
viridis	Frog ditto	full bud		J. C. P. &
		May 23		E. im T.
		by June 23		J. J. P.
chlorantha ...	Butterfly ditto ...	June 7		Mrs. Blake
		*June 3		
Listera				
ovata	Tway-blade	* May 8	May 21	J. W. P. &
		May 15		A. H.
Neottia				
nidus-avis ...	Bird's-nest Orchis	May 9	May 29	J. W. P. &
				G. F. B.
Iris				
Pseudacorus	Yellow Iris	by June 10		E. im T.
* germanica	Blue Iris	June 11		E. im T.
Crocus				
* vernus	Yellow Crocus ...	by Feb. 6	full fl. Feb.10	
Narcissus				
pseudo-narcissus	Daffodil	by Feb. 23	March 6	M. O. A.
Lencojum				
* Æstivum...	Summer Snowflake	April 23	April 10	
Galanthus				
nivalis	Snowdrop	Jan. 31	full fl. Feb.10	
Convallaria				
* majalis.....	Lily of the Valley	May 7	May 19	E. im T.
* bifolia	Twin-leaved ditto	May 30		
Polygonatum				
multiflorum	Solomon's Seal ..	May 13	May 21	E. im T.
Tulipa				
* sylvestris...	Wild tulip	* April 16	full fl. Apl. 23	J. C. P. & E.
		by April 22		im T.
Fritillaria				
* meleagris...	Snake's Head ...	April 16	April 3	
*Imperialis...	Crown Imperial ...	April 7	April 10	

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		1867.	1866.	
Ornithogalum				
*umbellatum	Star of Bethlehem	young bud April 19		
Scilla				
*bifolia	Twin-leaved Squill	Feb. 25	Feb. 10	
*sibirica.....	Siberian ditto	March 24	by Feb 10	
*cernua	Nodding ditto	April 21		
Allium				
*Schoenoprasum	Chive Garlic ...	June 3		
ursinum	Ramsons	by May 10		J. C. P. and E. im T.
*molle		May 3	May 12	
Endymion				
nutans	Blue-bell	April 9	April 13	H. M. H.
Muscari				
*racemosus	Grape hyacinth ...	by April 12	April 1	
Erythronium				
*Dens-canis	Dog's Tooth Violet	March 24		
Juncus				
effusus	Soft Rush	June 20		J. W. P. and L. H. Y.
conglomeratus	Common Rush ...	full bud June 14		
Luzula				
pilosa	Hairy Wood Rush	April 8	April 4	Mrs. Blake
campestris ...	Field Wood Rush	April 13	April 30	G F. R.
Arum				
maculatum ...	Cuckoo-pint	April 23	April 19	H. M. H.
Eleocharis				
palustris	CreepingSpike-rush	June 12		G. F. R.
Carex				
divulsa	Grey Sedge	May 28		E. im T.
vulpina	Great Rough Sedge	May 10	May 9	J. C. P. and E. im T.
*pendula.....	Pendulous Sedge	full bud Ap.27		
præcox	Vernal Sedge.....	April 23	April 22	J. W. P. and G. F. R.
pilulifera ...	Round-headed do.	May 27		E. im T.
glauca	Glaucous do. ...	May 4		E. im T.
sylvatica.....	Wood do.	May 15	May 9	J. W. P. and A. H.

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		1867.	1866.	
hirta	Hairy do.	June 12		G. F. R.
paludosa	River do.	by May 8	April 21	J. W. P. and L. H. Y.
riparia.....	Great River do....	by May 8	April 13	J. W. P. and L. H. Y.
Phalaris				
arundinacea	Great Reed Grass	June 12		G. F. R.
Anthoxanthum				
odoratum ...	Sweet Vernal grass	April 26	May 5	G. F. R.
Phleum				
pratense	Timothy Grass ...	June 14		H. T. S.
Alopecurus				
pratensis.....	Fox-tail Grass ...	April 18	April 30	
geniculatus...	Floating ditto	May 26	May 29	J. W. P. & G. F. R.
agrestis	Black Grass	June 5		J. C. P. & E. im T.
Milium				
effusum	Millet	May 9	not out May 10	J. W. P. & G. F. R.
Holcus				
mollis	Soft Grass	May 15		G. F. R.
Aira				
cæspitosa ...	Hair Grass	June 20		J. W. P. & L. H. Y.
caryophyllea	Silvery ditto	June 8		E. im T.
Trisetum				
flavescens ...	Yellow Oat-grass	June 8		
Avena				
pratensis	Narrow-leaved do.	June 14		
pubescens ...	Downy ditto	May 17		
Arrhenatherum				
avenaceum ...	Oat Grass	June 8		
Kœleria				
cristata	Crested Hair-grass	June 10		E. im T.
Melica				
uniflora	Melic	May 10	April 27	J.C.P.&E.imT.
Poa				
annua	Annual Meadow-grass	By Feb. 19	March 3	

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		1867.	1866.	
nemoralis ...	Wood ditto	May 20		
trivialis	Rough ditto	ByJune 4		E. im T.
pratensis.....	Common ditto ...	May 7	May 6	
compressa ...	Flat-stemmed ditto	May 17		
Glyceria				
fluitans	Flote-grass	June 23		J.A.L.&C.R.F
plicata.....		June 5		J. W. P.
Briza				
media	Quaking-grass ...	May 18	June 2	H. M. H.
Cynosurus				
cristatus	Dog's-tail Grass...	June 8		J. C. P.
Dactylis				
glomerata ...	Cock's-foot Grass	May 16	May 15	J.W.P.&L.H.Y
Festuca				
ovina	Sheep's Fescue ...	May 18	May 15	
rubra	Creeping Fescue	May 17		
Bromus				
erectus	Upright Brome-grass	May 19		G. F. R.
asper	Hairy ditto.....	June 20		
sterilis.....	Barren ditto	nearly out May 7	by June 28	G. F. R.
Serrafalcus				
commutatus	Tumid Field do...	full fl.Ju. 10		
mollis	Lop-grass	May 2	May 9	G. F. R.
Lolium				
perenne	Rye-grass	May 7	May 4	G. F. R.
Italicum	Italian ditto	full fl. Ju.10		
	Rye	May 11	May 15	J. C. P. and E im T.
	Wheat	June 18		J. W. P.
Equisetum				
arvense	Corn Horsetail ...	fertileAp.26	April 21	R. M. B. G. & F.J. H. J.
		barren May7	May 13	G. F. R.
limosum ...	Smooth ditto	May 23		G. F. R.
palustre	Marsh ditto.....	May 23		H. M. H.
Lastrea				
Filix-mas ...	Male Fern	4 ins. high April 22		H. M. H. & A. C. H.
Scolopendrium				
vulgare	Hart's Tongue ...	4 ins. high April 29		H. M. H.

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		1867.	1866.	
Pteris aquilina	Brakes.....	3 ins. high April 22		J. J. P.
Botrychium Lunaria	Moonwort	April 19	May 2	J. H. J.
Ophioglossum ... vulgatum ...	Adder's Tongue ...	May 4	April 23	J. J. P.

NEW SPECIES.

Corydalis tuberosa	A specimen in Mr. Brind's garden, said to have been found in West Woods. An escape from some garden, though the plant is very rarely to be met with near Marlborough.
Helosciadium inundatum...	Pond near Ivy's Farm, *J. W. P.* and *L. H. Y.*
Torilis nodosa	On the side of the Bath road, *J.W.P. & G.F.R.*
Pedicularis palustris	Ramsbury, *J. C. P.* and *E. im T.*
Carex hirta	College Bathing place, *G. F. R.* This plant was discovered last year by *G. F. R.*, but could not be sufficiently identified.
Aira Caryophyllea	Marlborough Downs, *E. im T.*
Poa compressa	College Wall. Probably this species.

NEW LOCALITIES.

Thalictrum flavum	Kennet, near bridge at bottom of Granham Hill, *E. im T.*
Viola Reichenbachiana ...	Plentiful on the borders of Fox Wood.
Genista anglica	Near the Obelisk, Savernake Forest, *J. J. P.*
Conium maculatum	Field near Barton House, *G. F R.* and *J. W. P.* Ramsbury, *G. F. R.*
Senecio campestris	Ogbourne Downs, *J. J. P.*
Menyanthes trifoliata ...	Plentiful in the meadow belonging to St. Peter's Rectory, and at Ramsbury, *J. W. P.* and *L. H. Y.*
Orchis latifolia	Ramsbury, plentiful, *J. C. P.* and *G. G.*
Gymnadenia conopsea ...	Row Down, *G. F .R.*
Habenaria viridis	Chiseldon, *J. C. P.* and *E. im T.*, near Savernake Ruins, *J. J. P.*
Carex vulpina	Chiseldon, *E. im T.* and *J. C. P.*
Asplenium adiantum-nigrum	Overton Downs, *J. W. P.*

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Botrychium lunaria ... ... Martinsell and Preshute, *L. C. C.* and *P. T.*; White Horse Down, Sergeant Doole's, and Savernake Ruins, *J. J. P.* Savernake Forest Cricket Ground.

The cold JANUARY checked vegetation, so that nothing appeared till quite the end of the month; on the 31st, Snowdrops were only just out.

FEBRUARY was remarkably warm, consequently plants were far more forward than usual. The only real exceptions were the *Hairy Bitter-cress* (9 days) and the *Twin-leaved Squill* (15 days), both of which are generally out in January. The *Siberian Squill*, which is generally in flower early in February, did not flower this year till March 24th; this great difference may have resulted from the bulbs having been transplanted.

The plants which were in flower *earlier* than last year are the *Wood Anemone* (nearly a month), of which several specimens were gathered before the end of the month; *Marsh Marigold* (22 days), at Lockeridge, but only in bud at Marlborough on the 28th; *Shepherd's Purse* (2 months), this was an unusually early specimen, as no more were found for six weeks; *Chickweed* (7 days); *Furze* (14 days, perhaps less); *Butter-bur* (12 days) at Mildenhall, not in flower at Marlborough till Feb. 28th; *Coltsfoot* (12 days); *Dandelion* (10 days); *Buxbaum's Speedwell* (14 days), a plant which seems to live all the winter, and to stand very severe frosts; *Ivy-leaved Speedwell* (6 days); *White Dead-nettle* (9 days), from last year's shoots; *Mezereum* (1 month); *Sallow* (14 days); *Black Poplar* (7 weeks); *Daffodil* (11 days); *Annual Poa Grass* (12 days).

The *Lesser Celandine*, *Sweet Violet*, *Barren Strawberry*, *Cornel Cherry*, *Hazel*, and *Yew*, seem to have flowered at nearly or quite the same time as last year.

The *Dog's Tooth Violet* was nearly out on the 23rd February, but on account of the cold weather, the flower never opened till March 24th.

Both kinds of *Avens* were in flower on the 17th February, and earlier. The flowers were from last year's shoots, which were only killed by the frosts of March.

The following were in bud at the times mentioned, but had not been found in flower by the end of the month.

Hairy Violet	Feb. 21.	...	Mrs. Blake.
Bullace	Feb. 17.	...	F. F. B.
Hawthorn	Feb. 26.	...	J. W. P.
Rue-leaved Saxifrage ...	Feb. 27.	...	G. F. R.
Moschatel	Feb. 28.	...	F. F. B.
Elder	Feb. 17.	...	F. F. B.
Lilac—flower buds appearing	Feb. 28.	...	

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Siberian Squill—nearly out	Feb. 24.	...	
Blue Bell—young bud ...	Feb. 21.	...	R. M. B. G.
Grape Hyacinth, buds above ground	Feb. 24.	...	
Dog's-Tooth Violet ...	Feb. 23.	...	
Cuckoo-pint—young spathe	Feb. 9.	...	G. F. R.

The following were showing leaves.

Bramble	young shoots ...	Feb. 26	J. W. P.
Hawthorn	young leaves ...	Feb. 26	J. W. P.
Orpine..	3½ inches high ...	Feb. 22	M. O. A.
Gooseberry	young leaf	Feb. 11	M. O. A.
„	bush green	Feb. 25	J. W. P. & E. im T.
Scarlet Ribes	bud bursting ...	Feb. 22	M. O. A.
Elder	young leaf	Feb. 9	G. F. R.
„	leaves well advanced	Feb. 22	R. M. B. G.
Wayfaring Tree ...	v. young buds ...	Feb. 16	T. E. M.
Perfoliate Honeysuckle	full leaf	Feb. 18	E. im T.
Honeysuckle	v. young leaf ...	Feb. 14	T. E. M. & H. M. H.
Snowberry	buds bursting ...	Feb. 25	H. M. H.
Privet	v. young leaves ...	Feb. 26	G. F. R.
Lilac	buds bursting ...	Feb. 11	
Deadly Nightshade ...	just appearing above ground	Feb. 24	
Early Purple Orchis ...	above ground ...	Feb. 23	M. O. A.

The exceedingly cold weather in MARCH retarded vegetation to a great extent, so that nothing grew till quite the end of the month. Those plants therefore, which do not generally flower till the beginning or end of the month were in bloom about their usual time; such were the *Tuberous Corydal*, *Whitlow-grass*, *Apricot*, *Peach*, *Plum*, *Scarlet Ribes*, *Ground Ivy*, *Common Elm*, and *Larch*.

Those which were in flower earlier than last year were the *Wild Pansy* (19 days); *Mouse-ear* (18 days), from last year's shoots; *Moschatel* (21 days); *Corn Salad* (35 days); *Germander Speedwell* (28 days); and *Cowslip* (6 days). The Corn Salad seems to have flowered when covered with snow; the Germander Speedwell was an unusually early specimen, no other flower being seen till May 4th.

Berberis fuscicularis, *Wych Elm*, and *Siberian Squill* were much behind their usual time. A specimen of what appeared to be Wych Elm was found in flower as early as Feb. 21st, by Mrs. Blake, but the trees generally were only in bud before the cold weather set in, so that when the snow melted the buds were in many cases killed, and consequently but comparatively few trees perfected any seeds.

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The *Sallow*, though its barren catkins were in flower in February, did not open its fertile ones till about the 3rd March: young leaves were found on the 27th, by *J. W. P.*

The *Daffodil* was plentiful about the 27th March, though many buds had been nipped by the frost.

The *Shepherd's Purse* was in flower from this year's shoots, not before the 31st March: it had been found in flower last month.

The following were in bud at the times mentioned, but had not been found in flower by the end of the month.

Blue Anemone		March 11	H. E. B.
Wood Violet		March 31	J. W. P.
Bladder-nut		March 2	
Gooseberry		March 29	E. im T.
Red Currant		March 30	W. D. P.
Rue-leaved Saxifrage ...	coloured buds ...	March 6	
Guelder Rose	fl. buds appearing ...	March 3	
Yellow Figwort ...		March 26	
Ground Ivy		March 26	E. im T.
Asarabacca		March 26	
Crown Imperial ...		March 25	
Bluebell...		March 31	J. W. P.

The following were showing leaves.

Spindle	leaf buds nearly open	March 22	F. F. B.
Broom	buds bursting ...	March 1	Mrs. Blake.
Dog Rose	shoots 1½ inches long	March 3	G. A. L.
Hawthorn	a few young leaves	March 27	L. C. C. & P. T.
Red Currant	buds bursting ...	March 5	W. D. P.
Wayfaring Tree ...	young leaves ...	March 3	
Snowberry	young leaves ...	March 27	J. W. P.
Sallow	leaves	March 27	J. W. P.
Hazel	v. young leaves ...	March 31	G. F. B.

During the first half of APRIL, vegetation seemed at a stand-still, almost every plant which came into flower during that period being behind its usual time, and but few plants showing either leaf or flower buds till about the 16th.

Those plants which were in flower about their usual times were the *Wallflower, Wood Violet, Sloe, Pear, Red Currant, Rue-leaved Saxifrage, Yellow Figwort, Asarabacca, Larch, Crown Imperial, Blue Bell, Hairy Wood-rush*; but it must be observed that many of these are cultivated plants; in fact a specimen of pear was found in flower as early as April 7, nearly a fortnight before, but no record was kept of the flowering of that plant last year, and it is,

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therefore, unfit for comparison; the trees observed last year flowered almost at the same time this year.

No plants were decidedly in flower earlier than last year.

Of those which were much later may be mentioned the *Hairy Violet* (14 days), *Bullace* (11 days), *Parley Piert* (25 days), *Pyrus Japonica* (32 days), *Gooseberry* (6 days), *Toothwort* (11 days), *Box* (6 days), and *Hornbeam* (about 20 days).

During the second half of the month a great change took place, and plants came rapidly into flower—so much so that several were in flower before their usual time.

Those which require especial notice are the *Upright Crowfoot* (16 days), *Creeping Crowfoot* (12 days), *Wild Pansy* (5 weeks), *Pepper-wort* (9 days), *Field Maple* (8 days), *Horse Chestnut* (8 days), *Strawberry* (8 days), *Common Avens* (8 days), *Venus' Comb* (16 days), *Early Scorpion-grass* (7 days), *Wall Speedwell* (22 days), *Birch* (15 days), *Early Purple Orchis* (5 days), *Allium Molle* (9 days); *Field Wood-rush* (17 days); *Sweet Vernal-grass* (9 days); *Foxtail Grass* (12 days), and *Moonwort* (13 days).

The following were in flower at or about the same time as last year. *Water Ranunculus (R. fluitans), Goldilocks, Buttercup, Bleeding Heart, Cuckoo Flower, Garlick Hedge-mustard, Wood Sorrel, Tuberous Vetch, Cherry Tree, Lady's Mantle, Apple, Wild Chervil, Comfrey, Archangel, Wood Spurge, Herb Paris, Cuckoo-pint, Vernal Sedge.*

The following were much later.

Blue Anemone (11 days), *Hairy Rock-cress* (13 days), *Navew* (9 weeks), *Honesty* (6 days), *Stitchwort* (7 days), *Sycomore* (6 days), *Water Avens* (11 days), *Golden Ribes* (8 days), *Ash* (about 6 days), *Stemless Gentian* (9 days), *Lungwort, Spotted Dead-nettle* (18 days), *Ribwort* (5 days), *Summer Snow-flake* (13 days), *Snake's-head* (13 days), *Grape Hyacinth* (11 days), *River Sedge* (about 7 days), *Corn Horse-tail* (5 days).

As a proof of the great difference of temperature between Marlborough and places only a few miles distant, may be mentioned the *Water Ranunculus*, which both in 1866 and 1867 was in full flower at Lockeridge a week before any flowers were observed at Marlborough, and the *Marsh Marigold*, referred to in the notices for February.

The *Corn Horse-tail* was found at Woodborough by W. E. M., on the 23rd April, and had evidently been out for some time as the fertile spike had done flowering and become shrivelled—no fertile fronds were observed near Marlborough till April 26; and the barren fronds did not appear till May 7.

Plums, though mentioned in flower on March 31 (as being the date of the flowering of the tree observed last year) were not generally in flower till April 16.

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In bud at the dates mentioned, but not in flower by the end of the month.

Pasque flower		April 19	
Columbine		April 19	
Yellow Poppy		April 26	
Greater Celandine ...		April 17	G. F. R.
Winter-cress		April 17	G. F. R.
Charlock		April 21	E. im T.
Woad		April 19	
Spindle		April 3	
Laburnum		April 19	
Great Burnet		April 28	J.W.P. & G.F.R.
Lady's Mantle		April 17	
Raspberry		April 21	G. F. R.
Hawthorn		April 7	H. R. A.
"	full bud	April 28	J.W.P. & G.F.R.
Crab Apple		April 21	G. F. R.
Mountain Ash		April 16	E. im T.
Red-berried Bryony ...		April 26	A.C.H. & H.M.H.
Rose-root		April 19	
Black Currant		April 26	A.C.H. & H.M.H.
Meadow Saxifrage ...		April 19	
Sanicle	v. young buds ..	April 8	Mrs. Blake.
Dogwood...		April 28	J.W.P. & G.F.R.
Wayfaring Tree... ...	full bud	April 23	
Marsh Valerian	full bud	April 23	
Ox-eye		April 26	G. F. R.
Leopard's-bane	young bud	April 19	
Musk Thistle		April 22	J. W. P.
Holly		April 28	J.WP. & G.F.R.
Ash	stamens appearing ...	April 19	
Bugle		April 22	J.C.P. & E. im T.
Common Sorrel		April 28	G.F.R. & J.W.P.
Scotch Fir	just in bud	April 23	J. W. P.
Butterfly Orchis ...	v. young bud ...	April 16	G.F.R & J.W.P.
Tway blade	above ground ...	April 16	G.F.R. & J.W.P.
Solomon's Seal		April 22	G. F. R.
Star of Bethlehem ...	v. young bud ...	April 19	
Allium Molle		April 19	
Pendulous Sedge ...	full bud	April 27	
Glaucous do.		April 22	A.C.H.&.H.M.H.
River Sedge, Great Sedge }	full bud	April 23	

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In leaf.			
Berberry	leaf	April 11	J.W.P. & G.F.R.
Lime	young leaves ...	April 12	G. F. R.
Field Maple	leaf	April 17	E. im T.
Sycomore	leaf	April 8	G. F. R.
Horse Chestnut... ...	leaf buds opening ...	April 4	
„	just green	April 19	
Spindle	leaf	April 7	F.P.M. & J.C.P.
„	quite green	April 17	
Broom	v. young leaves ...	April 30	
Laburnum	young leaf	April 19	
Cherry Tree	leaf	April 8	Mrs. Blake.
Dwarf Cherry	young leaves ...	April 7	J.W.P. & G.F.R.
Dewberry	leaf	April 7	G.F.R. & J.W.P.
Hawthorn	hedges green ...	April 24	
Apple	leaf...	April 8	G.F.R. & E.imT.
Gooseberry	full leaf	April 7	H. R. A.
Dogwood...	young leaves ...	April 28	G.F.R. & J.W.P.
Wayfaring Tree	leaf	April 19	G. F. R.
Guelder Rose	leaf	April 19	W. D. P.
Privet	young leaf	April 19	J.W.P.
Ash	young leaf	April 28	J.W.P. & G.F.R
Bitter-sweet	young leaf	April 23	J.W.P. & G.F.R.
Deadly Nightshade ...	only 3 inches high	April 19	
Hop	2 feet high	April 13	E. im T.
Beech	leaf	April 25	J.C.P. & E. imT.
„	some green	April 30	
Oak	buds bursting ...	April 19	G. F. R.
„	young leaf	April 26	A.P.H. & J.E.H.
Black Bryony	4 inches high ...	April 26	A.C.H. & H.M.H.
Male Fern	4 inches high ...	April 22	A.C.H. & H.M.H.
Hart's Tongue	4 inches high ...	April 29	H. M. H.
Common Brakes ...	3 inches high ...	April 22	J. J. P.
Jasmine	leaf buds bursting ...	April 27	J. W. P.

In MAY Vegetation progressed, a very large number of plants being in flower at or about the same time as last year. There were, however, some very remarkable exceptions, which will be detailed below. About the 23rd a very intense frost set in, which did great damage, and from which some plants were a long time recovering.

List of Plants much before their times of flowering last year:—

Globe Flower (15 days); *Yellow Rocket* (6 days); *White Campion* (12 days); *Dusky Crane's Bill* (8 days); *Wood ditto* (16 days); *Meadow ditto* (14 days);

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Spindle (10 days); *Dutch Clover* (8 days); *Ladies' Fingers* (6 days); *Laburnum* (7 days); *Dewberry* (14 days); *Hawthorn* (7 days); *Mountain Ash* (13 days); *Hogweed* (24 days); *Rough Chervil* (18 days); *Elder* (10 days); *Perfoliate Honeysuckle* (9 days); *Field Flea-wort* (8 days); *Holly* (13 days); *Hound's Tongue* (8 days); *Deadly Nightshade* (12 days); *Brooklime* (10 days); *Wild Thyme* (6 days); *Twayblade* (about 10 days); *Bird's-nest Orchis* (20 days); *Lily of the Valley* (12 days); *Solomon's Seal* (8 days); *Allium Molle* (9 days); *Quaking Grass* (15 days)

Those later than last year were—

Greater Celandine (6 days); *Fumitory* (30 days); *Charlock* (11 days); *Ragged Robin* (about 10 days); *Sycomore* (6 days); *Broom* (18 days); *Purple Clover* (8 days); *Bush Vetch* (8 days); *Small Burnet* (6 days); *Sibbaldia* (6 days); *Water Avens* (11 days); *Blue Sherardia* (11 days); *Crosswort* (13 days); *Gromwell* (16 days); *Field Scorpion-Grass* (20 days); *Ivy-leaved Toad-flax* (12 days); *Red Rattle* (7 days); *Common Sorrell* (25 days); *Walnut* (19 days); *Wood Sedge* (6 days); *Melic Grass* (13 days), and *Adder's Tongue* (11 days).

The following were in bud at the dates mentioned, but not in flower by the end of the month.

Meadow Rue			May 11	G. F. R.
Common Red Poppy ...			May 26	J.W.P. & G.F.R.
Bladder Campion ...	full bud	... ...	May 24	J. W. P.
Lime			May 10	J.W.P. & G.F.R.
Buckthorn			May 4	J.W.P. & G.F.R.
Scarlet Clover			by May 29	J. W. P.
Bird's-foot	full bud	... ...	May 16	J.C.P. & E.imT.
Meadow Sweet			May 13	J.W.P. & G.F.R.
Raspberry			May 10	J.W.P. & G.F.R.
Bramble			May 13	J.W.P. & G.F.R.
Dog Rose			May 19	G. F. R.
Syringa	full bud	... ...	May 25	
Water Dropwort ...			May 13	J.W.P. & G.F.R.
Wild Angelica			May 13	J.W.P. & G.F.R.
Guelder Rose			May 8	J.W.P. & L.H.Y.
Snowberry			May 27	E. im T.
Heath Bedstraw ...			May 27	J. C. P.
Valerian			May 8	A.C.H. & H.M.H.
Greater Knapweed ...			May 16	J.W.P. & L.H.Y.
Long-rooted Cat's-ear ...			May 16	J.W.P. & L.H.Y.
Rough Hawkbit.. ...			May 16	J.C.P. & E. im T.
Smooth Hawk's-beard ...			May 16	J.W.P. & L.H.Y.

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Privet		May 11	J.C.P. & E.im T.
Bitter-sweet	full bud	May 20	J. W. P.
Knotted Figwort ...	v. young bud ...	May 23	J.W.P. & A.H.
* Lamb's Tongue ...		May 15	G. F. R.
Broad-leaved Dock ...		May 14	J.W.P. & G.F.R.
Curled Dock		May 3	A.C.H. & H.M.H.
* Small Nettle		May 7	G. F. R.
Great Nettle	full bud	May 23	J.C.P. & E. im T.
Black Bryony	full bud	May 19	W. D. P. & R. M. B. G.
Frog Orchis	full bud	May 23	J.C.P. & E. im M.
Notices of leafing, &c.			
Lime	green	May 4	
Buckthorn	young leaf	May 4	J.W.P & G.F.R.
Laurel	shoots 1 inch long ...	May 2	J.W.P & G.F.R.
White Beam Tree ...	full leaf	May 8	J.W.P. & L.H.Y.
Ash	full leaf	May 8	J.W.P. & L.H.Y.
Common Elm	shoots 3 inches long	May 5	G.F.R. & J.W.P.
Wych Elm	shoots 9 inches long	May 11	E. im T. & J. C.P.
„	seeds	May 14	G.F.R. & J.W.P.
Black Poplar	leaf	May 8	J.W.P. & L.H.Y.
Lombardy Poplar ...	leaf	May 4	G.F.R. & J.W.P.
Sweet Chestnut	leaf	May 20	J. W. P.
Oak	shoots 3 inches long	May 6	A.C.H. & H.M.H.
Hazel	leaf...	May 4	E. im T.
Walnut	leaf	May 20	J. W. P.
Male Fern	2 feet high	May 15	G. F. R.

Damage done by the Frost, May 23, 1867.

Shoots quite killed :—

Ash, Holly, Ivy, Walnut, Box, Potatoes, Asparagus, Virginian Creeper, Dahlia, German Iris, Beans, and all seedlings as Tropæolum, Convolvulus, &c.

Much damaged :—

Oak, Beech, Sweet Chestnut, Laurel, Portugal Laurel, Rose, Acacia, Hornbeam, Horse-chestnut, Laburnum, Sumach, Phillyrea, Pinsapo, Yew, Spruce, Rhododendron, Spiræa, Fuchsia, Dielytra, Geranium ; almost all fruit trees, as Apple, Pear, Plum, Damson, Gooseberry, Currant, also Strawberries where exposed, Peas, if in bloom, Young Cabbage, Celery, Vegetable Marrows, as well as several Wild Flowers, Nettle, Wood Sanicle, Deadly Nightshade, Enchanter's Nightshade, Bracken, &c.

* I think this was in flower before the end of the month. No note was taken of the date of flowering.

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Had it not been for the frost of May, there would have been a remarkable correspondence between the times of flowering in 1867 and 1866, but as it was, those plants which *would* have been in flower towards the end of May were very much retarded; very few were much before their time of flowering last year, the only ones recorded were:—

Mallow (10 days); *Wood Vetch* (12 days); *Meadow Sweet* (more than 7 days); *Dog Rose* (8 days); *Snowberry* (20 days); *Yarrow* (7 days); * *Clustered Bell-flower* (17 days); *Chive Garlick* (6 days); *Great Reed Grass* (more than 16 days); *Hair Grass* (more than 8 days); and *Yellow Oat Grass* (6 days).

On the other hand, those plants which were retarded by the frost were the following:—

Corn Crowfoot (18 days); *Red Poppy* (17 days); *Hedge Mustard* (8 days); *Rock Rose* (12 days); *Bladder Campion* (6 days); *Thyme-leaved Sandwort* (about 20 days); *Bloody Crane's Bill* (11 days); *Round-leaved ditto* (25 days); *Slender Tare* (14 days); *Common Vetch* (12 days); *Bramble* (9 days); *Carrot* (21 days); *Dogwood* (26 days); *Honeysuckle* (9 days); *Field Scabious* (7 days); *Long-rooted Cat's Ear* (13 days); *Sowthistle* (9 days); *Mouse-ear Hawkweed* (17 days); *Foxglove* (12 days); *Cow-wheat* (12 days); *Sheep's Sorrel* (15 days); *Nettle* (26 days); *Blue Iris* (20 days); *Rough Meadow Grass* (27 days); *Wheat* (5 days).

In some few instances the earliest dates may not have been recorded, but as a rule the above may be considered in the main correct.

In bud at the dates mentioned, but not in flower by the end of the half-year.

Meadow Rue	June 21	E. im T.
Large Flowered St. John's Wort	June 16	E. im T.
Perforated ditto ...	June 19	J.W.P. & G.F.R.
Agrimony	June 10	J. W. P.
Hedge Parsley (T. Anthriscus)	June 14	G. F. R.
Hemlock	June 6	J.W.P. & G.F.R.
Quinancy-wort	June 18	G. F. R.
Lady's Bedstr aw ...	June 15	E. im T.
Valerian ... ... full bud	June 8	
Greater Knapweed ...	June 10	J. W. P.
Privet	June 16	J. W. P.
Horehound	June 16	G. F. R.
Waybread	June 19	E. im T.
Sharp Dock	June 14	
Broad-leaved Dock ...	June 15	
Curled Dock	June 14	
Common Rush ...	June 14	

* This is, perhaps, not a fair comparison, the plant observed this year was a cultivated specimen. No wild plants were observed even in bud.

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Notwithstanding the incessant watch kept up for procuring the earliest dates of flowering, some few have escaped notice, and some I have omitted to register. The following were certainly in bud or flower before we left Marlborough.

Cucubalus (v. young buds). Enchanter's Nightshade (in bud, if not killed by frost), Sickle-leaved Hare's-ear (nearly out); Laurustinus (a few flowers survived the frosts of January); Yellow Milfoil (in flower); Blue Sow-Thistle (nearly in flower); Orange Hawkweed (in flower); Rhododendron; Forget-me-not (in flower); Field Speedwell (*V. polita*); Clary (in flower); and Sun Spurge (in bud).

The following do not appear to have been observed even in bud:—*Prickly-headed Poppy; Smooth Long-headed Poppy; Corn Cockle; Rest-harrow; Hop Trefoil; Tufted Vetch; Trailing Dog-rose (R. arvensis); Hairy Willow-herb; Parsnep; Corn Chamomile; Ragwort; Burdock; Black Knapweed; Creeping Thistle (C. arvensis); Greater Periwinkle* (the plant seems to have died); *Field Bindweed (Convulvulus arvensis); Great Bindweed; Viper's Bugloss; Henbane; Water Betony; Eye-bright; Red Bartsia; Common Speedwell; Wood Betony; Scarlet Pimpernel; Good King Henry; Knot-grass;* and *Bur-reed.*

All of which have generally been observed in flower before the commencement of the holidays, and it seems very probable, therefore, that some were not even in bud by June 25.

ORNITHOLOGICAL NOTICES.

Kestrel (Falco tinnunculus)—Egg May 3rd, *J. E. Fenwick.*
Tawny Owl (Syrnium stridula)—Eggs in the Forest March 3rd.
Red-backed Shrike (Lanius Collurio)—Egg May 29th, *J. W. Parrington.*
Spotted Flycatcher (Muscicapa grisecla)—young birds June 2nd, *J. W. Parrington.*
Missel Thrush (Turdus viscivorus)—Egg April 6th, *F. F. Back, G. Berry.*
Song Thrush (Turdus musicus)—Egg April 1st, *S. A. Rogers.*
Blackbird (Turdus merula)—Egg April 4th, *C. E. Crawley.*
Hedge Sparrow (Accentor modularis)—Egg April 7th, *F. F. Back, G. Berry.*
Redbreast (Erythaca rubecula)—Egg April 11th, *E. im Thurn.*
Redstart (Phœnicura ruticilla)—Seen April 1, *J. W. Parrington,* Egg, April 29. — *Braine, L. C. Calley.*
Whinchat (Saxicola rubetra)—Egg June 13th, *J. W. Parrington.*
Wheat-ear (Saxicola œnanthe)—seen March 27th, *A. Armstrong, Esq.*

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Grasshopper Warbler (Salicaria locustella)—heard March 26th, *F. J. H. Jenkinson*, Egg May 28th.

Sedge Warbler (Salicaria plaragmitis)—Egg May 12th, *F. F. White; S. A. Rogers.*

Reed Warbler (Salicaria arundinacea)—Egg June 7th, *H. a'Court, J.G. Kitchen.*

Nightingale (Philomela luscinia)—heard May 1st, *A. C. Hilton.*

Common White-throat (Curruca cinerea)—Egg May 15th, *E. H. Davis, S. A. Rogers.*

Lesser White-throat (Curruca sylviella)—seen May 20th, *J.W. Parrington* and *G. F. Ruck.* Egg May 24th.

Willow Warbler (Sylvia trochilus)—seen April 15th, *F. J. H. Jenkinson*, Egg May 10th, *J. B. Oakeley.*

Chiff-chaff (Sylvia hippolais)—Egg May 18th, *A. Herklots.*

Gold-crested Wren (Regulus cristatus)—Egg April 28th, *R. Kingsford, J. G. Kitchen.*

Great Tit (Parus major)—Egg April 30th, *J. C. Palmer.*

Blue Tit (Parus cæruleus)—Egg April 26th, *L. C. Calley.*

Cole Tit (Parus ater)—Egg May 10th, *T. Tilleard.*

Long-tailed Tit (Parus caudatus)—Egg May 7th, *T. Tilleard, D. J. Blyth.*

Pied Wagtail (Motacilla Yarrellii)—Egg May 14th, *J. H. Lambert.*

Grey Wagtail (mortacilla boarula)—young birds June 16th, *J. W. Parrington.*

Tree Pipit (Anthus arboreus)—Egg April 25th, — *Knubley.*

Meadow Pipit (Anthus pratensis)—Egg May 25th, *J. B. Oakeley.*

Sky-lark (Alauda arvensis)—Egg April 16th, *J. W. Parrington.*

Wood-lark (Alauda arborea)—seen May 29th, *J. W. Parrington.*

Black-headed Bunting (Emberiza schœniclus)—Egg June 13th, *J.W. Parrington.*

Yellow-hammer (Emberiza citrinella)—Egg May 4th, *R. Glasse.*

Chaffinch (Fringilla cœlebs)—Egg April 25th, *E. B. Maitland.*

Mountain Finch (Fringilla montifringilla)—seen March 1st, *A. Herklots.*

House Sparrow (Passer domesticus)—Egg May 8th *P. M. Giles.*

Green-finch (Coccothraustes chloris)—Egg April 30th, *J. W. Parrington, A. Herklots.*

Gold-finch (Carduelis elegans)—Egg May 3rd, *H. C. Compton.*

Common Linnet (Linota cannabina)—Egg April 25th, *C. B. Sanders, S. Smallpiece.*

Starling (Sturnus vulgaris)—Egg April 24th, *J. W. Parrington, G. F. Ruck.*

Carrion Crow (Corvus corone)—Egg April 5th, *D. Soames.*

Rook (Corvus frugilegus)—Egg March 29th, *S. A. Rogers, A. Machen.*

Jackdaw (corvus monedula)—Egg April 20th, *J. T. Hunter, H. a'Court.*

Magpie (Pica caudata)—Egg April 13th, *J. W. Parrington, G. F. Ruck.*

Jay (Garrulus glandarius)—Egg April 20th, *J. T. Hunter.*

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Common Creeper (Certhia familiaris)—Egg May 20th, *J. T. Hunter*, *A. G. Hunter.*

Common Wren (Troglodytes vulgaris)—Egg May 2nd, *J. W. Parrington*, *G. F. Ruck.*

Cuckoo (Cuculus canorus)—heard April 18th, *H. M. Moule, Esq.*, *C. M. Bull, Esq.*; Egg May 19th, *F. F. White.*

Kingfisher (Alcedo ispida)—seen March 24th, *H. Hillyard.* Egg May 24th.

Swallow (Hirundo rustica)—seen March 25th, — *Harenc.*

Sand Martin (Hirundo riparia)—seen April 13th, *G. H. Dawson.*

Swift (Cypselus apus)—seen April 13th, *D. Soames.*

Ring Dove (Columba palumbus)—Egg April 9th, *H. Van Heythuysen.*

Stock Dove (Columba œnas)—Egg April 16th, *T. Tilleard*, *J. T. Hunter.*

Turtle Dove (Columba turtur)—Egg May 17th, *E. im Thurn.*

Pheasant (Phasianus colchicus)—Egg May 16th, *J. W. Parrington.*

Stone Curlew (Œdicnemus crepitans)—seen April 23rd *J. W. Parrington*, *G. F. Ruck.*

Peewit (Vanellus cristatus)—Egg April 13th, — *Otter.*

Woodcock (Scolopax rusticola)—seen in the Forest, February 20th, *T. Tilleard.*

Common Snipe (Scolopax gallinago)—seen March 24th, *G. H. Dawson*, *W. D. Dowding.*

Land Rail (Crex pratensis)—heard April 18th, *C. M. Bull, Esq.*; Egg June 13th, *J. W. Parrington.*

Moorhen (Gallinula chloropus)—Egg April 9th, *L. C. Calley*, *P. Thursby.*

Common Coot (Fulica atra)—seen February 15th, *J. W. Parrington.*

Teal (Anas crecca)—seen February 9th, *T. Tilleard.*

Dabchick (Podiceps minor)—Egg April 23rd, *J. H. Lambert*, *E. Square.*

Herring Gull (Larus argentatus)—seen April 17th, *J. H. Lambert*, *E. Square*, April 22nd, *O. Ilbert, Esq.*

MUSEUM REPORT.

The following report on the condition and relative wants of the Museum has been drawn up by the President. In the Geological Section the society has had the benefit of a visit from Mr. J. R. Gregory, of the South Kensington Museum. This gentleman's aid was secured to give a skilled professional classification of the geological specimens, an excellent and well-considered measure, which has been of the greatest value. Mr. Stainton, whose name is so widely known to entomologists, and who is now happily by no means unknown at Marlborough, has kindly reported on the branch most familiar to himself. We hope that these, and the remaining details in the report will be looked at with care and interest, as they clearly show what the society's resources are, and how they may be improved.

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We may now at once present Mr. Gregory's report:—

GEOLOGICAL COLLECTION.

The collection of fossils is well represented in the whole of the Tertiary series, except Glacial (Pleistocene) and a few Woolwich and Thanet characteristic species. The White Chalk poorly represented and Upper Greensand rich as regards number, but requiring a few characteristic species; Lower Chalk and Lower Greensand very fairly represented, but requiring a few of the common species; Gault very fair; Wealden and Purbeck and Portland particularly well represented; all the Oolites downwards, except inferior Oolite, very poorly represented indeed; Lias well represented by a very good series; Permian very thinly; Coal Measures a very good series; Carboniferous Limestone very moderately, ought to have about 20 species added at least; Devonian, very fair, except in fishes, requiring about 6 species; Upper and Lower Silurian particularly good, requiring only a few Llandeilo, Lingula, Tremadoc Slate, and Cambrian, about 10 or 12 species.

To Mr. Bright, Mr. Mullins, and Mr. Gilmore the society is mainly indebted for this collection.

MINERAL COLLECTION.

The mineral collection, formed mainly by the exertions of Mr. Gilmore, is thus noticed by Mr. Gregory, "requires about 60 specimens to make really a very good collection, the want of certain specimens of which make the collection imperfect, these being very important and well-known species; generally, however, the specimens are very good, and illustrative."

Since the above report was written, a large number of the specimens required have been added though the liberality of Mr. Bright, Mr. Sowerby, Mr. Delisle, Mr. R. W. Taylor, and Mr. Moule. Twenty-five specimens only are now wanted to complete the collection arranged in the glass cases; but the collection necessary for practical analysis is still very imperfect, both in the quality and quantity of its specimens.

ENTOMOLOGICAL COLLECTION.

This at present only consists of a collection of British Moths and Butterflies, upon which Mr. Stainton reports as follows:—"The collection is in good order and neatly arranged in a plain glazed cabinet of 32 drawers. The main object of the collection is to serve as a reference whereby to assist the boys in naming their captures, also to enlarge their ideas by enabling them to see representatives of species, which they have not themselves met with. There are many species, comparatively common, which are still wanting in this collection, but there are probably many entomologists scattered about the country, who, whether Old Marlburians or not, will gladly lend a helping hand to a collection formed for so useful a purpose."

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For the present collection, the society is especially indebted to Mr. J. W. Dunning, Mr. Edwin Birchall, Mr. S. Stevens, Rev. Joseph Greene and Mr. T. Brown, of Cambridge, among those not connected with the College; and to W. W. Dayman, J. W. Mills, G. K. Mills, and A. Marshall, among old Marlburians. Individual specimens have been added from time to time by various members of the school, as opportunities occur; but it is a rule never to take from present members of the school unless they have their proper number in their own collection. Rarities, therefore, are seldom, if ever, added by them.

BOTANICAL COLLECTION.

The society may congratulate itself upon having a very excellent collection of Dried Plants. It was formed about seven years ago, and at that time required about 50 species to form a complete collection of British Plants. Recent discoveries have not been added, but it is hoped that the collection will not be long without them. Among the liberal donors of specimens may be mentioned Mrs. Beckett, of Lyncombe Vale, Bath, H. C. Watson, Esq., the late Mr. Borrer, the late Joseph Wood, Esq., the late Professor Henslow, Professor Balington, Rev. W. Leighton, of Shrewsbury, Rev. A. Bloxam, Mr. W. Barton. A large collection also was obtained by purchase. The cabinet in which the specimens are kept was subscribed for by most of the Common Room. *

ORNITHOLOGICAL COLLECTION.

The collection of eggs contains representatives of the eggs of most of the birds found about Marlborough, many of them contributed by members of the school. The collection in other respects is very defective.

The collection of stuffed birds was only commenced in earnest this half year, and through the liberality of members of the Ornithological section, especially of E. im Thurn, already numbers 30 specimens, a list of which is given below.

Marsh Harrier (1), Kestrel (2), Sparrow Hawk (2), Ring Ousel (1), Redbreast (1), Snow Bunting (1), Rook (1), Magpie (2), Nuthatch (1), Kingfisher (1), Night-jar (2), Pheasant (4), Red-legged Partridge (2), Peewit (1), Moorhen (1), Coot (1), Pintail Duck (1), Black-backed Gull (1), Ruff (1), Reeve (1), Stormy Petrel (1), Grey Phalarope (1).

* The President of the Society, Rev. T. A. Preston, who reports on this collection here, omits his own name. It is necessary, therefore, to state generally that he has been the Society's most constant benefactor, and that the Botanical department is specially indebted to his knowledge and his liberality.

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THE WEATHER.

The weather at Marlborough during the first quarter of the year was so similar to what was experienced in other parts of England generally, that it will be sufficient to copy Mr. Glaisher's report.

"The month of January opened with a low temperature and severe frost; till the 5th day the deficiency of temperature was nearly 15° daily. On the 4th day this defect was as large as 23°, and the temperature was as low as Zero at many places, and below Zero at several. (It was 1° at Marlborough). Snow fell frequently all over the country, to an unusual amount, and rendered communication both by ordinary roads and by railroads difficult, and in some places traffic was wholly suspended. This unusually severe weather was succeeded by a sudden thaw, and a succession of heavy gales of wind from the west and south-west. The great change in the temperature broke up the frost, and cleared away the snow very rapidly, the sudden melting of which caused rivers to overflow in many parts of the country. From January 6th to the 10th days the average excess of daily temperature amounted to 7°.

"On the 11th day another frosty period set in, and extended to the 22nd day; during this period there were several very heavy falls of snow, particularly in the Northern parts of the kingdom, where several persons perished in the snow, being overtaken by it and frozen to death. The deficiency of temperature for these 12 days was on the average of 9¾° daily.

"On the morning of the 23rd day the weather underwent a rapid change; the mean temperature of this day was no less than 20° of higher temperature than that of the preceding day, thus introducing a period of almost unparalleled warm weather of the extraordinary duration of 35 days, or till February 26th. The average excess of temperature during this period was 7° daily; and we must go back as far as 1779, or 88 years, for an analagous period of the same length of higher temperature. In the years 1794 and 1850 the same temperature was nearly experienced. The melting of the snow at the beginning of this period, together with the heavy falls of rain, caused inundations in various places, and especially in some parts of Yorkshire and Lincolnshire.

"From February 27th to the end of the quarter, with the exception of the five days from March 23rd to 27th, the weather was always cold and of a wintry character; there were frequent falls of snow and sleet up to a very late period in the month all over the country. Till March 22nd, the deficiency of the temperature averaged 6½° daily.

"The months of January and March will be remembered for their severe frosts and heavy falls of snow; that of February for its high tempera-

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ture, and the whole quarter for a very unusual succession of high winds and gales.

"The months of February and March were not favourable for agricultural operations; in the former month, owing to frequent rain and the flooded state of the land, and in the latter month, spring farm work was frequently interrupted by its protracted wintry character, damaging growing crops, and checking vegetation."

The only special remarks which need be made upon the above are (i) that at Marlborough, the amount of snow which fell in January was far less than elsewhere—in fact the water obtained from the melted snow was less than the amount of rain in January, 1866. (ii) In March traffic was greatly impeded by the snow which fell on 12 days at Marlborough; though more on the Downs. On the 23rd a sudden thaw took place, causing floods exceeeding in extent any which had occurred during the last 53 years, but which lasted but a very short time.

The temperature during April was much about the average, but the air was very damp (more or less rain falling on 22 days), and the wind frequently very high; there was, too, very little sunshine, the amount of cloud being 8·4 whilst in the three previous years it was only 7·0, 4·7, and 6·5 respectively, (the *maximum* amount being represented by 10). At the same time there was but little frost, hence though vegetation did not progress rapidly, it did not experience any checks: in 1866 ground frosts were very frequent.

The temperature during May was very variable. It reached its maximum on the 6th, when it was 78·8°, but immediately afterwards fell till on the 13th it was only 48·3°, this cold period lasted till the 25th (except a slightly warmer period on the 18th, 19th, and 20th,) when it rose to about its proper average for the rest of the month. During the cold period from the 13th to the 28th snow fell at times and some very severe frosts occurred, which did great damage, destroying in a great measure the fruit crops, which up to that time were doing well, and showed promise of a plentiful supply of fruit. The mean temperature for the month, though higher than that in 1866, was below its proper average.

The temperature during June was much below its proper average. The month opened with warm weather, but from the 3rd to the 21st the temperature was below its proper average, a break, however, occurring on the 10th, 11th, and 12th, when it was above 70°. From the 23rd to the end of the month the temperature increased by day, but generally kept on decreasing at night, so that the range of temperature was very remarkable, being more than 35° on the 28th, and 32° on the 30th.

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	Mean height of Barometer.		Monthly range.		Mean temperature of air.		Mean daily range.		Maximum in shade.		Minimum in shade.		Maximum in sun.		Minimum on Grass.		Mean degree of Humidity		Mean amount of Cloud.		Amount of Rain.		No. of days on which it fell.	
	1867	1866	1867	1866	1867	1866	1867	1866	1867	1866	1867	1866	1867	1866	1867	1866	1867	1866	1867	1866	1867	1866	1867	1866
	in	in	in	in	°	°	°	°	°	°	°	°	°	°	°	°					in	in		
JANUARY...	29·204	29·375	1·480	1·778	33·2	41·5	13·0	12·7	54.5	58·8	1.0	16·1	82·4	85·1	3·2	13·8	91.0	89·2	7·1	7·8	4·102	4·400	18	23
FEBRUARY	29·602	29·227	1·665	1·770	44·0	39.7	11·9	13·2	64.6	58·6	29·6	37·2	100·8	88.9	19.2	15·5	89.6	90·4	8·5	7.2	2·531	3·857	21	22
MARCH ...	29·310	29·221	1·512	1·340	35·5	39·5	11·2	14·9	54·4	61.6	19·3	15·3	114·6	115·9	19·0	12·6	92.2	86·4	8·0	7·9	3·824	2·327	21	20
APRIL.....	29·340	29·430	1·289	0·986	47.5	46.3	15·5	15·8	65·7	72.8	29·2	30·0	130·0	122·0	22·8	20.5	89.5	83·7	8·4	7·0	2·831	2·393	22	21
MAY	29·422	29·512	0·780	0·872	51·3	48·8	18·3	21·0	78·8	70·9	25·5	25·7	138·3	122.5	22·4	18.3	81.8	67·4	7·5	5·8	2·447	1·919	12	10
JUNE	29·642	29·469	0·906	0·814	55·7	58·8	18·9	19·4	77·8	81.0	36·4	39·7	142·2	121·0	31·5	42·2	83.1	78·0	7·0	6·6	1·696	3·238	12	18
MEAN.....	29·420	29·372	1·272	1.260	44·5	45·8	14·8	16·2	...	...	...	...	...	...	...	...	87·9	82·5	7.7	7·0	...	...	...	...

Total amount of rain during the six months in 1867—17·431 inches; in 1866, 18·134 inches.

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ACCOUNTS.

Received.	£	s.	d.
Balance from December, 1866	20	6	9
Subscriptions from Members	4	17	0
Donations...	11	6	6
Sale of Reports, Midsummer, 1866	0	16	6
„ Christmas, 1866	22	18	6
	£60	5	3

Paid.	£	s.	d.
Printing of Third Report	15	0	0
Ditto Fourth Report	25	0	0
Cabinet Maker	2	2	0
Bookcase, &c.	9	7	0
"The Zoologist" (1st instalment)	2	16	9
Stationery	1	0	3
Bookbinding	0	13	6
In hand	4	6	6
	£60	5	3

June, 1867.

T. R. DUMERGUE, Hon. Treasurer.

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LIST OF DONATIONS.

	£	s.	d.
A. Armstrong, Esq.	0	2	6
Rev. H. Bell	0	10	0
E. H. Carr	0	2	6
G. H. Dawson	0	5	0
W. W. Dayman, Esq.	0	10	0
Rev. W. Gardner	0	5	0
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C. Hodgson, Esq....	1	0	0
R. Hunter, Esq.	1	0	0
W. Koch, Esq.	0	10	0
E. im Thurn	0	7	0
F. J. H. Jenkinson	0	6	0
J. Mills, Esq.	0	10	0
H. M. Moule, Esq.	1	0	0
Mrs. Norris	1	1	0
J. C. Palmer	0	4	6
J. W. Parrington...	0	2	6
Rev. T. A. Preston	0	10	0
Rev. J. J. Pulleine	0	7	6
H. T. Stainton, Esq.	2	0	0
Rev. T. Stanton	0	10	0
Smaller	0	0	6
	£11	6	6

SPECIAL DONATIONS

For purchasing Specimens—For the Collection of Minerals.

Rev. J. F. Bright	1	0	0
Rev. J. Sowerby	1	0	0
Rev. G. W. Delisle	0	10	0
R. W. Taylor, Esq.	0	10	0
H. M. Moule, Esq.	0	10	0

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LIST OF LIBRARY.

No. of Vols.	Name of Book.	Donor.
5.	Intellectual Observer	Rev. J. M. Fuller.
5.	Popular Science Review...	„
3.	Recreative Science	„
1.	Flora of Marlborough	Rev. T. A. Preston.
2.	The Entomologist	„
2.	Entomologist's Monthly Magazine	„
2.	The Ibis	„
6	The Geologist	Rev. T. Cornthwaite.
3.	The Geological Magazine	„
1.	Ootheca Woolleiana (Part 1)	Professor Newton.
1.	Memoir of J. Woolley	„
1.	Cassell's Birds	A. Herklots.
1.	Synopsis Floræ Helveticæ	Rev. H. Baber.
3.	Flora Germanica	„
1.	British Algæ	Mrs. Gray.
1.	British Ferns	„ .
7.	Linnæus Systema Naturæ	Rev. H. E. Booth.
1.	British Spiders	H. A. Evans, Esq.
1.	Kirby and Spence's Entomology	W. W. Fowler, Esq.
1.	Dana's Mineralogy	J. B. Gilmore, Esq.
2.	Various Papers reprinted from the Quarterly Journal of the Geological Society ...	H. Woodward, Esq., F.G.S., &c.
1.	Montagu's British Birds...	Rev. T. A. Preston.
1.	Morris' British Fossils	„
1.	Wood's Index Entomologicus	Purchased.
1.	Handbook of Geological Terms (Page) ...	„
2.	Hewitson's British Birds' Eggs	„
23.	Zoologist...	„
1.	Sowerby's British Wild Flowers	„

MARLBOROUGH:
C. PERKINS, PRINTER, HIGH-STREET.

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REPORT

OF THE

MARLBOROUGH COLLEGE

Natural History Society,

FOR THE

HALF-YEAR,

ENDING CHRISTMAS, 1867.

"Tum mihi Naturæ libeat perdiscere mores,
Quis Deus hanc mundi temperet arte domum."

MARLBOROUGH:
Printed by C. Perkins, Times Office.
1868.

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PREFACE.

To begin by refering to an appeal made to the upper part of the School in our last Report, we have still to regret that the actual ranks of the Society are so thinly recruited from the Sixth and Fifth Forms. Several reasons may be suggested for this state of things: but, however it may be accounted for, it is a point to be regretted, partly on School grounds, partly also as indicating a low degree of interest in subject matter which is yearly becoming more prominent in schemes of liberal education.

On the other hand, there has been a very striking increase indeed in the general attendance at the Meetings. There have been as many as 113 present at a single meeting. And, comparing the two last years, the average number of persons present in 1867 was 31.3 against 41.3 in 1866; and the average of visitors was 57.4 in 1867 against 24 in 1866. These facts speak for themselves. The printed notices of meetings which have recently been very carefully distributed by the Secretary have probably done much to promote attendance.

The presentations made to the Society during the last half-year were numerous and valuable. There have been presented by J. B. Gilmore, Esq., a collection of Birds' Skins from the Orkneys; a large collection of Fossil Fish, and some remains of a Pictish Chief's dwelling; by J. M. Donne, a collection of Zoological specimens from the West Indies; by Mr. G. Gauntlett, eggs of Gold and Silver Pheasant; by the President, eggs of Raven, Heron and Greater Bittern, Blue-throated Warbler; by Mr. T. Brown, a pair of Acidalia Interjectaria: by E. C. Sewell, two pair Buffalo Horns, Head of Albatross; by Mr. H. M. Moule, "Conversations in Chemistry," 2 vols.; Wells on *Dew*; by E. im Thurn, pairs of Song Thrush (with nest of young

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birds), Missel Thrush, Redwing and Fieldfare; by Rev. J. Greene, a box of Insects; by W. Bartlett, Esq., some Fossil Sponges from the Gault; by Mr. W. Odham, a monstrosity of the Red Deer's Horn, and a Pipe Fish; a practical scientific volume by Mr. F. C. Lightfoot; thirty-three Birds' Skins by Rev. J. F. Bright; seven Birds' Skins from J. W. Parrington; and several small contributions from Mr. S. Dixon (Lecturer in Geology), Mr. Brampton, Mr. Velvin, and A. R. Wiggin. The Society's best thanks are especially due to J. B. Gilmore, Esq., for the splendid donation which stands first on the list.

The Society is rich in periodicals connected with scientific research. It takes in on its own account the *Geological Magazine* and *Zoologist*; from the President it receives the *Ibis*, the *Entomologist*, and the *Entomologist's Monthly Magazine*; and the Rev. J. M. Fuller most kindly continues the *Intellectual Observer* and *Popular Science Review*.

We cannot but think that it would be an unfortunate sign for the future should these and other stores of information accumulate without some active use being made of them.

In conclusion, we remind the School of the Natural History Prizes, kindly offered by the President for an Essay on some branch of Natural History. The prospectus of these prizes is enclosed; the essays should be sent in by June 1st, 1868. It may be hoped that they will help to stimulate the practical study of those pursuits which the proposer has already done so much to encourage in the School.

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LIST OF MEMBERS.

PRESIDENT.

* Rev. T. A. Preston.

SECRETARY.

* G. H. Dawson.

TREASURER.

Rev. T. A. Preston.

LIBRARIAN.

E. im Thurn.

COMMITTEE.

The Ex-officio Members.
C. M. Bull, Esq.
G. Holden.
E. im Thurn.

EDITING COMMITTEE.

Rev. T. A. Preston.
G. H. Dawson.
G. H. Holden.

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H. M. Moule, Esq.
W. E. Mullins, Esq.
F. E. Thompson, Esq
C. M. Bull, Esq.
Rev. J. F. Bright.
Rev. J. Sowerby.
Rev. H. Bell.
Rev. C. W. Tayler.
A. Babington, Esq.

MEMBERS.

T. E. Maclean.
A. Herklots.
E. H. Carr.
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A. C. Hilton.
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P. G. Young.
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F. J. C. Boles.
J. B. Fuller.
M. H. Smith.
G. E. Manisty.
W. Greg.
M. H. Soames.
H. Manders.
* G. G. Monck.

* Heads of Sections.

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RULES.

1.—That this Society be called the Marlborough College Natural History Society.

Constitution.

2.—That the Society consist of Members and Honorary Members.

Officers.

3.—That the Officers of the Society consist of a President, Secretary, Treasurer, and Librarian, to be elected from and by Members of the Society.

Management.

4.—That the affairs of the Society be conducted by a Committee, consisting of the President, Secretary, and three other members of the Society, to be elected from and by Members of the Society: three of whom shall form a Quorum.

President.

5.—That in case of an equality of votes, the President shall have a double or casting vote.

6.—That in the absence of the President, the Committee be empowered to request any member of the Society to take the chair.

Committee.

7.—That on the occurrence of any election, each member of the Committee have double the number of votes of any other Member of the Society.

8.—That two Members be appointed half-yearly by the Society, to assist the Secretary in Editing the Report.

Secretary.

9.—That the duties of the Secretary be to keep a list of all the Members of the Society, and of all former Members and Benefactors who may wish to receive the Reports of the Society; to summon meetings (when necessary) of the Society; to keep a detailed report of the proceedings, as well as lists of Members and Visitors present at each meeting, and generally to act under the direction of the Committee in all matters connected with the welfare of the Society.

10.—That in the absence of the Secretary from any meeting of the Society, minutes of the proceedings be taken by a member of the Committee, appointed by the President.

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Treasurer.

11.—That the duties of the Treasurer be to collect all sums of money due to the Society; to receive all donations of Money; and to disburse all sums payable by the Society out of the funds entrusted to him.

12.—That the Treasurer furnish half-yearly a detailed account of the receipts and disbursements to be audited by the Committee.

13.—That the funds of the Society be placed in the College Bank, and that no money be withdrawn by the Treasurer without the signature of the President to the order; or in his absence, that of the Secretary.

Librarian.

14.—That the duties of the Librarian be to keep a catalogue of the Library, with the names of the Donors; to see that the Library Regulations are carried into effect; to be responsible for the order of the Museum, and when necessary to assist the Secretary in the distribution of the Reports of the Society.

Library.

15.—That Any Member of the Society be at liberty to consult any of the books belonging to the Society, but that only certain volumes, to be decided on by the Committee, be allowed to be taken from the room.

16.—That if any Member wishes to take a volume from the Museum, he shall give his name, and the name of the book, to the Librarian, who shall enter them in the book kept for the purpose.

17.—That every volume so taken out be returned by the end of the quarter, but that no book be kept more than one month.

18.—That if any volume be damaged, such damage shall be reported by the Librarian to the Committee, who shall decide upon any further proceeding in the matter

Museum.

19.—That any Member of a section, who is not a Member of the Society, be allowed access to the Museum at such times as it is open to Members of the Society generally, provided he first obtain leave from the President, which leave shall be renewed every quarter, but may be taken away at any time, if the privileges be abused in any manner.

20.—That the same privileges be extended, under the same conditions, to such other Members of the School who may wish to use the Library and Collections for the purposes of study, provided there be a reasonable excuse for their not belonging to a section.

21.—That in all cases the Museum be used for the study of Natural History alone, and not as an ordinary Reading Room.

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Members.

22.—That the election of new Members rest entirely with the Committee.

23.—That every Member pay a half-yearly subscription of 2*s.* 6*d.*, to be paid at the first meeting of the Society in that half-year.

24.—That if a Member be elected at, or after the Quarter, he shall only pay 1*s.* on Election.

25.—That Members have the right to be present, to state their opinions and to vote at all general meetings of the Society; to introduce a visitor at general meetings of the Society; to have personal access to, and to introduce a visitor to the Museum; and to have a copy of the Report half-yearly.

Visitors.

26.—That on such occasions when the number of those who wish to be present as visitors at the general meetings of the Society is greater than the number of members who attend, the President and Committee shall be empowered to admit two or more each, as shall seem fit.

Honorary Members.

27.—That Honorary Members have all the privileges of Members, except the power of introducing a member of the School to the meetings of the Society.

Suspension of Members.

28.—That any Member be liable to be excluded from the Society by the Committee, if, in their opinion, he shall have failed to show sufficient energy the working of the Society.

Sections.

29.—That sections be formed for the more accurate study of the different branches of Natural History, and that the Heads of these sections be chosen by the Committee half-yearly from Members of the Society.

30.—That these sections shall hold meetings as often as shall seem fit to the Heads of the several sections, at which any member of the School, with the sanction of the head of that section may attend.

Meetings.

31.—That ordinary meetings of the Society be held once a fortnight, but that the Secretary be empowered to call extraordinary meetings when necessary.

New Rules

32.—That any Member of the Society have power to propose any new rule or any alteration in an old one, provided the motion be seconded by another Member.

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MEETING HELD AUGUST 23RD, 1867.

THE following donations were exhibited, and thanks ordered to be given to the Donors :—

A collection of 43 Birds' Skins, among which were those of the Raven, Great Northern Diver, Greater and Lesser Black-backed Gulls, Common Gull, Cormorant, Velvet Scoter, Puffin, Razor-bill, Black Guillemot, and Common Guillemot, Redshanks, Oyster-catcher, &c., by J. B. Gilmore, Esq.

A large collection of Fossil Fish, from the Orkneys, also by J. B. Gilmore, Esq.

A Bull Frog, pair of Sawyer Beetles, Young Shark, Flying Fish, Lizards, and other West Indian Curiosities, by J. M. Donne.

Eggs of the Gold and Silver Pheasant, by Mr. G. Gauntlett.

Egg of the Raven, by the President.

A pair of *Acidalia Interjectaria*, a species of moth new to Britain, by Mr. T. Brown, of Cambridge.

A pair of Buffalo Horns, and a Head of an Albatross, by E. C. Sewell.

A work entitled "Conversations in Chemistry," by H. M. Moule, Esq.

E. IM THURN exhibited a specimen of the Bohemian Waxwing, shot in Devonshire.

J. B. JARVIS, a small Hornet's Nest with the Queen Hornet.

G. H. Dawson was elected to the office of Secretary, to take the place of W. R. Carles, who resigned, and E. im Thurn to the Committee and Office of Librarian, vice R. F. Isaacson.

A Subscription was afterwards opened towards defraying the cost of a a Wall-Case, for the reception of the Collection of Birds belonging to the Society; and the Sum of £2 19s. was collected on the spot.

There were 46 persons present.

MEETING HELD SEPTEMBER 6TH, 1867.

Ornithology.

THE following additions were made to the Museum :—A case containing a Heron and a Greater Bittern (a British specimen), presented by the President; a case containing pairs of Song Thrush (with nest of young birds), Missel Thrush, Redwing and Fieldfare, presented by E. im Thurn.

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E IM THURN exhibited a Blue-throated Warbler (British specimen) and White variety of the Willow Wren; and the President a pair of Eggs of the Bee Eater from Spain.

Entomology.

Donation:—A box of British Insects, among which were specimens of *N. Cucullina*, *N. Ditrapezium*, 5 species of *Eupithecia*, &c., by the Rev. J. Greene. F. J. H. Jenkinson gave his Report.

Larva of *A. Alni*, found by L. Chapman, and variety of larva of Poplar Hawk (*S. Populi*), found by J. B. Oakeley, were exhibited.

Botany.

THE PRESIDENT gave his report, recording the discovery of two plants new to the College list, and exhibited specimens of the *Prickly Pear* and *Aloe* from Spain.

There were also exhibited Hairs from an Elephant's Tail, by C. J. O. Irwin, and an Impression of the Seal of a Priest of Thibet, by T. E. Maclean.

A Lecture was given by C. M. Bull, Esq., on his Walking Tour in Cornwall.

R. B. Mainwaring, A. Herklots, A. M. Hardy, and F. W. Head tendered their resignations, and G. E. Manisty was elected a member of the Society.

Notice was given that a private meeting of the Society would be held on Tuesday, September 10th.

There were 95 persons present, among whom were the Master and Mrs. Bradley, Mrs. Bull, and an unusually large number of Members of the Common Room.

MEETING HELD SEPTEMBER 10TH, 1867.

THIS was an extraordinary meeting, called at the request of A. C. Hilton and E. H. Carr, to consider the expediency of abolishing Rule 22, and substituting in its place the following:—

"That Candidates for admission into the Society be proposed by any one Member, and seconded by another at any ordinary meeting of the Society, and be balloted for at the next meeting, and that not less than two-thirds of the Members balloting shall elect."

After considerable discussion, in which A. C. Hilton and H. M. Hilton spoke in favour of the amendment, and the President, C. M. Bull, Esq., and G. H. Dawson against it, the question was put to the vote, and lost by a majority of 8; 13 against 5 for.

There were 19 members present.

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MEETING HELD SEPTEMBER 20TH, 1867.

THE following donations were announced, and thanks ordered to be given to the donors :—

A set of Fossil Sponges, from the Upper Gault, at Savernake, collected and presented by Mr. W. Bartlett.

A pair of Buffalo Horns, by E. C. Sewell.

A curious monstrosity of a Red Deer's Horn, and a Pipe Fish, by Mr. W. Odham.

A work entitled "That's It," by F. C. Lightfoot, Esq.

Entomology.

F. J. H. JENKINSON gave his report, recording the capture of 3 species new to the College list.

J. B. FULLER exhibited a specimen of the moth *O Literana*, the first specimen taken in the neighbourhood.

THE PRESIDENT exhibited two Boxes of Brazilian Insects.

Ornithology.

G. H. DAWSON exhibited a pair of Hawfinches, shot at Preshute, and purchased by the Society: and E. im Thurn a remarkably fine specimen of the same, and a Corncrake, which latter he presented to the Society's Collection.

Archæology.

T. R. DUMERGUE announced the commencement of a collection of Coins for the Museum, and exhibited, on behalf of W. H. Churchill, a silver token of the county of Devon.

E. C. SEWELL exhibited a Japanese box and coins.

Mineralogy.

E. B. MAITLAND exhibited a fine specimen of Iceland Spar, Galena, and Sulphate of Iron; and W. Greg, specimens of Blende, from Alston, Cumberland; Iron Pyrites, and Liver Iron Ore, from Workington.

Botany.

THE PRESIDENT gave his Report, recording the discovery of the Blue Fleabane, (*Erigeron acris*), new to the College list, by G. F. Ruck, and exhibited specimens of the Stinkhorn Fungus (*Phallus Impudicus*); and, on behalf of A. J. Norris, a drawing of *Cordiceps militaris*, a fungus peculiar to under-ground pupæ of moths.

E. IM THURN exhibited a Photograph of the black-stalked variety of the Lady Fern.

E. IM THURN read a paper, illustrated by numerous specimens, on Wasps and Wasps' Nests.

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A. Babington, Esq., was elected an Honorary Member, and J. B. Fuller, M. H. Smith, and G. H. Holden, Ordinary Members.

There were 72 persons present: 19 members, 53 visitors.

MEETING HELD OCTOBER 4th, 1867.

Ornithology.

G. H. Dawson exhibited a collection of 33 Birds' Skins, presented to the Society by the Rev. J. F. Bright; and E. im Thurn, a light-coloured variety of the Barn Owl.

Entomology.

H. M. Hilton read a list of notices.

Geology, &c.

The President exhibited a specimen of Nickel, from Inverness, and of Meteoric Iron, from Tolucca, in Mexico.

E. Almack exhibited a specimen of Iron Pyrites, in flint; H. M. Hilton, a fossil fish, from the Orkneys; and W. Greg, specimens of stalactite (polished and unpolished).

Botany.

The President, on behalf of Dr. Fergus, exhibited a living specimen of the Castor Oil Plant, in flower, and seeds of the same; also, Maize, Reed and Palm, from Spain.

Archæology.

T. R. Dumergue exhibited some coins of the Roman Empire, presented to the Society by J. C. Brown.

There were also exhibited a living specimen of the Cray Fish, from the Kennet, by the President; some "Trophies from Waterloo," by H. M. Hilton; and a Spanish Knife, by F. B. Jarvis.

T. R. Dumergue read the following paper, illustrated by diagrams, on

THE WANS-DYKE.

The peculiar interest which is presented to us by a study of the Archæology of Wiltshire, is caused, not so much by the number, as by the variety of its antiquities. Besides ancient curiosities and associations belonging to the last eight centuries, we find relics of the Britons, the Romans, and the Saxons, in as rich a variety as can be boasted of by any county in England.

Of the British period, we find the remains of villages, of trackways leading from one village to another, of strong fastnesses, of extensive earthworks of various kinds, and a large number of reminiscences of the early British

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religion, cromlechs, cistvaens, barrows, stone circles, and, lastly, the two supposed temples of Abury and Stonehenge. All these are to be found in this county.

Roman work of various kinds is traceable in this county in the roads, towns, military stations and camps, pavements, coins, and the like.

The Saxons also have left several traces in our neighbourhood, chiefly in their earthworks. It is to be observed, however, that most of these earthworks appear to have been formed at two distinct periods, which seem to show that the Saxons built upon and strengthened the works of their predecessors, in preference to making fresh works.

Having made this brief summary of the kind of antiquities which recall to us the habits and life of these three races, I am now in a position for commencing my subject.

The Wans-dyke, as most of you know, is a great earthwork extending through the entire breadth of this county, and also through Somersetshire, running from east to west. It is more than 80 miles long, and seems to have formed a connecting link between the Severn and the Thames. It consists of a rampart and a moat, running side by side, the former being on the south side of the latter. From the top of the rampart to the bottom of the moat, it measures, in some parts, 40 feet. Its course appears to have been chosen in such a way as that it should form a connecting link, not only between the Thames and the Severn, but, also, between several fortresses situated between those two rivers. Such is the Wans-dyke itself; I shall next speak of the persons by whom it was probably constructed, for constructed by human hands it certainly was.

First of all, we are safe when we say that it could not have been erected by any Normans or Englishmen, in the modern sense of the word. It must have been made before the Norman Conquest, as we certainly should have some record of its construction had it been made after it. Nor can it well have been made by the Romans, for such a structure is quite out of keeping with anything else of which the Romans have left us an example. They have left us specimens of their towns, baths, villas, roads, bridges, and camps; but nowhere do we find them to have constructed a huge barrier like the Wans-dyke (for such was evidently its object) to prevent an enemy from making incursions from the north; though it is difficult to conceive the possibility of its ever being sufficiently manned. Who, then, besides the Romans, and before the Normans, lived in the country south of the Wans-dyke? I say south of the Wans-dyke, because the moat is north of the rampart, which, granted that the earthwork was made for a defence, proves that those whom it was intended to protect must have lived south of it. The two races whom we know to have occupied this part of the country, and to whom the Wans-dyke has been at

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various times ascribed, were the Belgæ, before the Roman Conquest, and the Saxons after it.

That the former constructed it was the opinion of Stukely. These Belgæ lived in Somerset, Wilts, and Hants, making Winchester (*Venta Belgarum*) and Bath their principal towns. Stukely supposed them to have been one branch of the great Belgic family, who had streamed into Gaul at an early period, and from whom modern Belgium receives it name; they are, however, by some persons considered as being a totally different race from those of Gaul. The name Wans-dyke he derives from *guahan, dyke, i.e.*, 'division dyke,' the object of it being to shut out the Celts or, it may be, the Romans, who might attack them from the north. Between this dyke and the South Coast there are three others of a somewhat similar kind, and these four may be naturally supposed to have been raised at different periods by the Belgæ, the second being thrown up as the first was crossed by the enemy, and so on. Stukely believes, too, that Divitiacus, a king of the Suessiones, of whom Cæsar speaks, was the actual constructor of the dyke, he having been thought by some persons to have founded Devizes, which is in the same neighbourhood. But, apart from this theory, another has been very widely held, namely, that the Saxons made it, either as a barrier between Wessex on the south, and Mercia on the north, or else between the Saxons of Wessex, and the Danish invaders. And certainly the name appears to be Saxon, Wans-dyke being very probably a corruption of *Woden's ditch*, Woden being the War-god of the Saxons and Danes; Aubrey tells us that the Saxon name was Wodenesdic. The name of this god appears also in Wodenburghe (identical now with Woodborough, near which the Wans-dyke passes, or else with Wanborough, a village near Swindon) where Ceauline, a King of the West Saxons, sustained a severe defeat from the Britons, which caused him to fly from the country.

This latter theory is supported by the existence of a similar structure, the well-known Offa's-dyke, built by Offa, King of Mercia, between the mouths of the Dee and the Wye, to protect his kingdom from the Britons who inhabited Wales.

I shall now briefly trace the course of this dyke from its western extremity. It is supposed to have started from Portishead, a small town at the mouth of the Bristol Avon, and formerly a Roman harbour. But it does not stand out prominently until it reaches a place called Maes Knoll Camp, about five miles south-west of Bristol. It then crosses the high road, and makes for Stantonbury Camp. Both of these Camps appear to be British, though they bear marks of Saxon improvement. From the latter, which is of great size, one can get a very fine view of Bath on one side, and of the Welsh Mountains on the other. In the neighbourhood of Bath the Wans-dyke is totally lost sight of, and, excepting a small fragment here and there, we do

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not recognize it again until we reach Morgan's Hill, a down lying between Bishop's Cannings and Calne. Here it suddenly branches out from the Roman Road called Julian Street, with which our Bath Road coincides as far as Silbury Hill. It appears that the Roman Road had been made in the ditch of the Wans-dyke itself. At first sight, we should certainly conclude this, but, when we compare the straight course which the Roman Road still takes after its junction with the Wans-dyke, with the continual winding and turning which, in every other part, characterizes the course of the dyke, we begin to doubt whether the two could have really run on for any distance together. But, before throwing overboard its claims to British origin, and the theory that the Romans seized upon it as being convenient for converting into a road, we ought to find out what its course really is, if it be not identical with that of the Roman Road; but, this having been found impracticable, we need not relinquish the idea of the two being, for some distance, coincident,—in other words, the idea that the Wans-dyke existed prior to the Roman Road, and, therefore, was a Belgic structure.

On tracing the course of the dyke further eastwards, we soon descend the down and cross the modern Devizes Road, at a place called Shepherd's Shore, where a single cottage, formerly an inn, stands alone in the valley, and where little is to be seen upon the downs for miles around except, here and there, a British tumulus and this huge ditch and mound.

The dyke, then, after descending the hill and being pierced through by the modern high road, immediately ascends another hill, called Tan Hill (the name being a corruption of St. Anne's Hill), upon which, in former times, a fair used to be held annually. Over this hill, which is of great height, the Wans-dyke pursues its course, continually winding about, up-hill, down-hill, to the right, to the left, according to the requirement of the hill. Here it may be seen to great perfection; the rampart is in this part exceedingly high, the ditch very deep. And I would advise any one who, on the whole holiday, or when any other opportunity occurs, may want a good walk in which to have an extensive view, a good fresh breeze, and something to see at the end of his journey, to walk along the Wans-dyke, upon St. Anne's Hill, having turned off from the Bath Road at Beckhampton, and to continue this route as far as Shepherd's Shore, then to strike for Bishop's Cannings, and, finally, to Devizes.

Before I pass on from Tan Hill, let me mention a circumstance which has thrown great light upon the difficult question of the origin of our Dyke. At the western portion of this hill, it was discovered some years ago, on making a cutting through the rampart, that it consists of two totally different layers. These layers were probably made at very different times, hence we may infer that the bank was, at a subsequent period, heightened, and thus made a

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stronger barrier than it had been before; and this seems to harmonise with what I have already said, namely, that the Belgæ probably constructed it at first to protect themselves from the incursions of the Celts or Romans; but in after times the Saxons strengthened it considerably, gave it its name, and used it as a barrier to divide two great kingdoms.

It continues its winding course over Tan Hill, the rampart never meeting with a break except where a sheep-road has been cut through it. After extending for several miles over the down, it enters the West Woods a short distance beyond Lockeridge, through the entire length of which it passes, no longer uncovered and bare, as it was on Tan Hill, but thickly overgrown with wood. It next passes through the southern part of Manton Coppice, and meets the Pewsey Road 200 yards beyond the sign-post pointing to Manton. At the point where it meets the high road, its moat has been made into a bridle road, just as the Roman Road runs along the moat on Morgan's Hill. As it leaves the road on the south side, it passes across a field, where nearly all traces of it have been removed by the plough; but when it reaches the opposite side of the field, it runs along the edge of it, crosses the railway, and passes the two larch clumps, on the way to Martinsell, with which you are all familiar. But in this part the moat seems to have been much filled up, and the rampart to have sunk a great deal. After continuing about a mile further towards the Forest, it suddenly disappears altogether for a time, having been destroyed by the plough. All traces of it have gone until it has passed right through the Forest, and we again track it for a short distance on the left of the high road from Marlborough to Great Bedwyn, where it takes a southerly course, and after once more disappearing re-appears at Chisbury Castle. This fortress, situated as it is only six miles from here, and, therefore, easily accessible to most of us, I shall attempt to describe. It is of an oval form, surrounded partly by a double, partly by a treble rampart, except for a short distance on its eastern side, where the "vallum" has been levelled in order to make way for buildings. In area it measures nearly 15 acres (a larger area than that of Barbury, which is only 12½ acres), while the circuit of the outer-rampart is 1012 feet. From the top of the vallum to the bottom of the moat is a descent of 45 feet.

It is very well situated upon a rising ground between the two Bedwyns, and, from the number of trees growing upon its banks, forms a conspicuous object from the railway. We know nothing of the earlier history of the Castle; an examination of the rampart has brought to light, 15 feet below the present surface, a turfed embankment, some old British pottery, black ashes, and charred wood, which prove that it was originally a British stronghold. But the present rampart has been thrown up over these British remains, showing that, at some subsequent period, its fortifications were

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strengthened. And this bears out the tradition existing, namely, that Cissa, a Prince of the West Saxons, Viceroy of Wilts and Berks, under Escuin, made this his stronghold. Here, as the Saxon Chronicle informs us, a bloody conflict took place in 695, between Wulphere, King of Mercia, and Escuin, King of Wessex. It seems probable that the Britons had constructed it as a place of safety for their families and property in time of war, the charred wood being the remains of their huts; and as Barbury, a British work and the scene of the battle which witnessed the entire subjugation of the Britons by the Saxons under Cynric, was seized by the Saxons and made into a stronghold, in the same way Chisbury was taken from the Britons by Cisse, the Saxon, fortified, and made his chief post. The water, which lies in the northern part of the moat, to the depth of four feet, was evidently not intended to be there originally; Saxons never appear to have filled their moats with water.

Within the Castle there is a small chapel dedicated to St. Martin, formerly belonging to the parish church of Great Bedwyn, now used as a barn. Its architecture appears to have been a very graceful specimen of the decorated style, and it is mentioned as having been built before the year 1341.

From this Castle the Wans-dyke has been traced southward across the canal, and up the opposite hill, upon which it appears to have almost disappeared, but the few vestiges of it which remain show that it here made a bend eastward, and at a place called Prosperous Farm, three miles south of Hungerford; and, also, at Sadler's Farm it again appears in its more perfect state for a short distance. Beyond this point, I am unable to describe its course, as I have not yet been able to find any further account of it, the traces being so very difficult to determine.

A vote of thanks to T. R. Dumergue, for his services to the Society, was proposed by the President, and seconded by C. M. Bull, Esq., and carried unanimously.

An election was then held to supply the two vacancies in the Committee, and C. M. Bull, Esq., and G. H. Holden, were elected.

Rev. C. W. Tayler was elected an Honorary Member; and H. Manders, W. Greg, and H. Soames, Ordinary Members.

There were 77 persons present: 21 members, 8 honorary members, and 58 visitors.

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MEETING HELD OCTOBER 18TH, 1867.

In the absence of the President, the Chair was taken by C. M. Bull, Esq.

Geology.

W. Greg exhibited a specimen of Volcanic Glass, from the Cape of Good Hope.

E. Almack some fossilized Tusks, and

H. A. A'Court a piece of Serpentine.

Entomology.

H. M. Hilton exhibited a box of Brazilian Insects, and

H. Manders some Chinese Beetles.

H. M. Moule, Esq., presented to the Society a work entitled "Wells on Dew."

G. H. Dawson read the following paper on

THE SWALLOW.

I have chosen the swallow as the subject of my paper from the feeling that it is perhaps the bird of all others which is looked upon with the most interest, even by those whose pursuits are not of an ornithological kind. I shall not attempt to treat the subject in a very scientific manner, but I hope I may find something to interest you in the habits of the swallow which have come under my own personal observation. From the days of old, mythology and the tale told by so many of the old poets, of Procné changed into a swallow with blood-stained breast, from the time of the Greek poet Anacreon, who has several odes addressed to the swallow, the bird has been familiar, and has received a friendly greeting from all. Telling us by its welcome twitter of the return of spring, it cannot fail to be one of the most interesting of our migratory birds, and much more so than many of the slender-billed warblers, which return to us about the same time, but which are hardly noticed by most persons from their more retiring habits.

Perhaps in speaking of what may be called the type of migratory birds, it may not be out of place to preface my remarks on it by a few words on the migration of birds generally. Many birds impelled and guided by instinct, acting upon an impulse which, unknown to themselves, and unreflected upon, influences their movements, display habits of periodical migration. Truly wonderful indeed is the instinct, which prompts them when food begins to fail in one country to seek it in distant lands, and which at the same time tells them with unerring accuracy the way to seek those lands. And not less wonderful are the energy and perseverance of these little creatures, which enable them to surpass no small obstacles, and to fly

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for miles without rest over land and sea. It seems very strange how the wings of many birds which do not seem adapted for very long flights can carry them such long distances without flagging: the swallow appears to be naturally gifted with considerable powers of flight, but even its wings must be wearied before it has completed its long journeys. With regard to its possible speed of travelling, I find it stated that the swallow is capable of flying 90 miles an hour, and the swift about 130 miles, so they may well put the express train to shame if these accounts are to be relied on, and I should fancy that they cannot be far from the truth.

In spring the swallow and nightingale and numerous other birds leave their winter quarters in Southern Europe, in Asia, in Northern and sometimes in Central Africa, and visit our islands and Northern Europe generally: various other birds on the contrary, and especially water fowl, which find subsistence here in the winter, depart in the spring for the polar regions, where the melting of the ice insures their finding sufficient food. Migration, it seems, is always performed in regular stages, generally during the night, and in most cases by flocks, associated into vast bodies and acting in concert. The males are said to precede the females in a body by themselves, separating on their arrival, select their respective territories, and utter their call-notes to attract the females: this is remarkably apparent in the case of the nightingale and the quail. Some birds, more perhaps than we know of, on their return visit their old homes, and repair their old nests, or build new ones closely adjacent to them: of this the swallow and house-martin are the more prominent examples: it has often been ascertained with certainty that the same bird returns year after year, by catching one of the birds and marking it in some way, the bird returning with its mark the following season. It is in Africa that the swallow takes up its winter quarters; by some it is said to travel as far South as the Cape of Good Hope, but others deny that, and maintain that it confines itself to the tropical regions: coming from these quarters it visits nearly the whole of Europe, and is found even in the most northern countries, such as Lapland, Norway, Denmark, and Sweden: moreover swallows are met with in the colder parts of North America, and it may be noticed that they are apparently not so sensitive to cold as is generally supposed, but seek warmer climes when our winter approaches, compelled rather by scarcity of food than by the severity of the weather.

One interesting question occurs to me on the subject of migration, namely, how many miles is the swallow, or any other migratory bird, capable of flying at a time without rest. It does not seem very easy to find an answer to this. I have mentioned above that the swallow is supposed to be capable of flying 90 miles an hour: but this of course cannot be its travelling speed. Now, to get to Africa from England, it must necessarily cross

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the Mediterranean somewhere. Supposing it to traverse the whole of Spain, which, I should think, is not very probable, then the Straits of Gibraltar alone have to be crossed, a distance of only eight miles, a mere nothing. If on the contrary the bird chooses its route only through France, when it gets to the extreme South, say to Marseilles, it has about 500 miles of sea to cross without much chance of getting a rest. This, even at the almost incredible speed of 90 miles an hour, would take more than five hours, and I should think we ought to allow a space of at least ten hours. I have not been able to come to any satisfactory conclusion on the subject, or to find any sufficient account of it, therefore I merely mention it as an interesting subject for enquiry, and should be very glad of any information as to the longest distance that birds are capable of flying, and the longest time that they can remain on the wing. I find that swallows have often been seen, both in autumn and spring, crossing the Mediterranean: sometimes they will take a short rest on the rigging of the ships, and often remain there for a considerable time to recover strength; now and then they dip into the sea, and go on again refreshed by their salt-water bath.

The swallow comes to us as early as any of the other birds of its tribe, arriving about the same time as the martins, and generally a fortnight or three weeks before the swifts. The actual date of its first appearance may vary slightly in different seasons, but the first comers generally find their way here about the first of April, and are soon followed by the main body. "One swallow does not make a summer" as the old proverb says, and we always see that a few stragglers precede the rest by some days. The birds generally appear to be fatigued on their first arrival, and do not begin to employ themselves in nest-building for a week or two, but give their whole attention to hawking for flies, thus recruiting their strength before setting about their work. As long as the summer weather lasts, and food is abundant we have the swallows with us: at some time in the month of October they generally leave us; and then may often be seen gathering together in large flocks before beginning their travels.

Years ago it was supposed by some persons that many, if not all swallows pass the winter in a state of torpor, as in the case with some animals and reptiles, but this has never been proved, as far as I know, with regard to any of the feathered tribes: however, be this as it may, it is certain that swallows and martins may occasionally be seen in warm days even in the depth of winter, which seems to show that some of them must remain with us during the whole year; and some persons have declared that they have seen them descend into hollow trees on these wintry days; and, further, there is an account given on tolerable authority of a pair of martins who had left their breeding until rather late in the season (and therefore could not remove their

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young before the winter set in) and who plastered up their nest with mud, and left the young birds to remain there for the winter; according to the account, the young birds came to life again the next spring. With regard to birds hibernating in this way, there are several instances on record of land-rails, which are also migratory birds having been found in the winter in holes in the ground, and these seem more worthy of credit; but even taking for granted the truth of such instances as these, they are after all only the result of circumstances, and are but exceptions to the general rule, difficult as they are to account for. As to the old theory that swallows passed the winter at the bottom of some muddy pool, I think it may be discarded at once. It is not very difficult to see what may have given rise to such a supposition; for hundreds of swallows may often be seen, about the time of their departure, congregated together in flocks, and gathering, as evening comes on, in some osier bed. (I have seen them doing so myself more than once in the osier bed opposite the Master's garden): here they seem for a time to be very restless as though they were quarrelling desparately for the best places, but as it grows dark they gradually settle in quietly for the night, though even then a stone thrown amongst them creates a great uproar. Probably it was upon this fact that the old naturalists built their theory of the birds passing the winter in mud, imagining that the willows were only a stage preparatory to the oozy soil at their roots. Enough however of the migratory and winter residence of our birds; let us now consider them during the time of their stay in our country.

Every one knows the ordinary situations of the swallow's nest, and there is no need to say much on that subject generally: they are sociable birds, and seem to rejoice in the company of man, so that their nests are generally close to some house. Sometimes the bird will choose a strange situation for its dwelling. We have had a nest for some years at home, placed under the cover of a house-bell, in such a position, indeed, that it would not be moved by the ringing of the bell, but still it seems strange that the bird should not be disturbed by so much noise so close to it: despite of this, however, I have reason to believe that they have always succeeded in rearing their brood in safety. I should think it most probable, according to the general opinion, that the same pair of birds, or at least one of the pair, return year after year, to their old abode.

During the past summer I have been much interested by watching a pair of swallows which had built their nest under a verandah just outside our dining-room window, so close that it might easily be reached with the hand from the upper part of the window: the birds seemed to have no sort of objection to be watched provided the window were shut, but if it was left open they showed shyness until the young ones were hatched, and

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then they seemed bold enough for anything. The old bird sat on her eggs without any signs of fear, though some one was constantly looking at her: it was when the young birds were hatched that the most interesting time began. At first the parents did not seem to bring them food very often in the day, but when they were nearly fit to leave the nest the visits were most incessant. I determined to watch them one day, and remained doing so for more than half-an-hour, and I found that on an average one of the birds came at least once a minute, the visits amounting to just about six in five minutes. Each bird seemed to have its own beat for searching for food, for invariably they came the same way, one appearing over a garden-wall, and flying straight to the nest for the distance of some hundred yards, whilst the other came from one side, and could only be seen when within a few yards of the nest. Scarcely more than a second was occupied in giving the food, and I noticed that one of the four young birds, perhaps the strongest and most clamorous, seemed to get considerably more than his share; once it struck one of the old ones that he was getting too much, and the attentive father or mother divided the beak-full of flies between it and its next door neighbour; this was the only instance I noticed in which more than one bird was fed at a single visit. When the young birds were able to leave the nest there seemed to be great excitement with the old ones—they taught them first to perch on the branch of a fig-tree close to the nest, and this they did not leave for the purpose of flying any distance on the first day, but after this scarcely anything was seen of the young ones during the day time, though for many days they would invariably return to the nest in the evening and roost in it—then as before the old birds brought them food until it was very nearly dark.

It is remarkable that the swallow and the rest of his tribe do not seem to roost until it is very nearly dark, whilst most birds retire to rest some time before it is even dusk. I suppose the fact is that the evening, especially a calm and still evening, is a remarkably good time for catching flies: and perhaps swallows, as trout, may feel their appetites sharpened about that time. Any one who has stood by the side of a Devonshire trout stream as evening closes in, must have noticed how the water seems to be alive with fish about that time, and these of course are in pursuit of the moths and flies, which begin to appear at dusk.

One can hardly help being struck with the skill with which the swallows and still more the martins attach their nests to such smooth surfaces: it seems quite wonderful how they can make the clay hold properly together, and stick where they want it. Martins, I believe, moisten the mud with a peculiar glutinous fluid from their throats, and very possibly swallows may do the same thing, though I have not been able to find any notice of the kind in their case. We are told that they have been observed to work up long

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straws with the mud, as straw is used with bricks, and hair with mortar, their instinct guiding them to the same expedient. Even after the nest is built they have sometimes difficulties of a different sort to contend with, namely thieves, more especially sparrows. These have often been known to take a fancy to a snug-looking martin's nest and, might constituting right, to have expelled the lawful owners; but sometimes the latter have reduced the entrance of their nest to a very small size, just enough to admit themselves and too small for the sparrows. Still more curious is an instance of vengeance taken by a pair of swallows upon a sparrow which had succeeded in possessing himself of their nest. Having made many vain efforts to dislodge the intruder they came one morning, followed by several other swallows, all provided with mouthfuls of clay, and together they contrived to plaster up the entrance hole before the sparrow could effect his escape, and so formed his ill-gotten nest into a prison, where he must either have been smothered or have died of starvation.

Swallows and all the other members of their tribe are entirely insectivorous birds, thus doing a considerable amount of good to man, and no harm whatever. Some idea may be conceived of the vast quantity of flies and insects destroyed by a single swallow by watching an old bird feed its young: almost the whole of the day seems to be occupied without any intermission in the search for food, and according to my calculations mentioned above, a single bird will in about two minutes fill its beak with insects. I find it mentioned that on picking up a swift which had been shot, a number of minute flies and beetles, some mutilated, others scarcely injured, where observed crawling out of the birds beak. The throat seemed to be perfectly stuffed with them, and as many were collected as when pressed close would be contained in the bowl of an ordinary table-spoon. When closely examined the greater part of the minute insects destroyed by these birds will be observed to be of one kind, and it is a curious fact that by far the greater part of those which suddenly fly into our eyes are of the same genus, if not the same species as those which constitute the main part of the swallow's food. It may seem strange at first, but it is a fact, that spiders are devoured by swallows to a great degree. The fact is that the air is filled with a vast number of small spiders, and to a height almost incredible: of the quantity we may form some idea from the perfect carpeting of webs which are sometimes to be seen on an autumn morning. These are the webs of the gossamer spider, which, rendered heavy by the dew collected on their threads, fall to the ground and cover whole acres. Everyone knows the common weather rule that when swallows fly low there will be rain, when high there is a prospect of fine weather. This is of course very easily accounted for; they feed entirely on insects, and the flight of insects depends in a great degree on the state of the atmosphere.

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When it is clear and dry they rise; if moist, or likely to be so, they keep nearer the ground, and the swallow in pursuit of them supplies us with an accurate and easily available weather glass. As to the pretensions of this class of birds to receive the name of songsters, the swallow has perhaps the most claim to the distinction: it utters a pleasing kind of twitter when on the wing, and also when perched on the tops of trees. The note of the swift can hardly be called melodious: it utters a kind of sharp scream whilst on the wing, which has earned for it the name of "scritcher" among the Wiltshire rustics. The house and sand-martin utter a low and plaintive note: the latter can hardly be said to sing.

I must not entirely omit to notice the swallows which make the edible nests, dainties so highly esteemed by the Chinese. These birds are remarkably small, so much so, that it takes about 10 of them to weigh 2½ oz. They are found in great numbers in the island of Java, and the nests form an important article of trade among the natives of the island, and fetch a very high price; the cost is from 30 to 42 shillings per pound. The total export per annum consists of about 2,500 pounds. The principal purchasers are of course the Chinese: the way of cooking the peculiar dainty is as follows: a number of nests are cleaned, and put into some earthenware vessel with a duck or fowl, and left over a slow fire for about 24 hours. There are different theories as to the material of which the nest is made, the most fanciful of these is that it is formed of the foam of the sea; another which seems more probable is that it is made of some kind of sea-weed.

G. G. Monck was elected a Member of the Society.

There were 69 persons present at this meeting; 3 hon. members, 21 members, and 45 visitors.

MEETING HELD NOVEMBER 1ST, 1867.

Ornithology.

E. IM THURN exhibited a specimen of the "Tengmalmi Owl," shot in Cornwall.

Entomology.

H. M. HILTON read a list of captures made during the last fortnight.

Archæology.

G. G. MONCK exhibited a coin of Edward I., found in the cricket field, and presented to the Society by Mr. C. Brampton. Also some other coins, and a seal of a monastery, lately presented to the Society.

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THE PRESIDENT exhibited, on behalf of J. B. Gilmore, Esquire, an interesting series of remains from the house of a Pictish Chief in the Orkneys, consisting of a deer's antler, bones of sheep and rat, the "land-whelk," and bone implements.

Botany.

THE PRESIDENT exhibited specimens of *Lastrea Borreri*, and *L. Thelypteris*, two ferns new to the College List, and presented by S. Dixon, Esquire, of Pewsey.

Zoology.

THE PRESIDENT exhibited the skin of a Boa-Constrictor, presented to the Society by Mr. F. Velvin.

G. H. HOLDEN then read the following paper, illustrated by diagrams, on

GLACIERS.

It has been observed by Saussure that if a man were raised in a balloon high enough over the mountains of Switzerland and Savoy, he would see several parallel ranges of mountains, of which the centre one would be the highest, and that the tops of the highest mountains would be covered with snow, the sides and declivitives with snow and ice, and that the bottom would be covered with fields of ice. So there is a regular gradation from the snow on the summits, to the ice of the Upper Glaciers, which becomes more compact and solid in proportion as it approaches the Lower Glaciers and amalgamates with them.

Let us now see how Glaciers are formed. There is, you know, a definite line, called the snow line, on all mountains of great height, above which the snow is perpetual; this is at the point where 32°F. is the maximum temperature in summer. Above this line the snow, were melting the only way of removing it, would accumulate, and accumulate so rapidly that in 100 years, according to the calculation of Bishop Rendu, one of the earliest observers of Glaciers, Mont Blanc would be 400 feet higher than it is, and in 1000 years 4000 feet higher. It is obvious, however, that nothing of the kind takes place, partly no doubt because great masses are broken off in the form of avalanches, but chiefly because the greater portion is removed by the Glaciers in the form of *Ice*. For the snow, accumulating above the snow-line, by its pressure gradually, very gradually, changes the snow below the snow-line into solid ice. This pressure is the main agent, yet pressure could not do it alone, just as you cannot make a snowball out of all kinds of snow, for if there is a frost and the snow is dry it will not bind: so too the pressure of the snow above is not by itself sufficient to form the snow below the line into ice, there must be some heat, that is some moisture: accordingly it is not until the temperature is

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above 32° F., or, in other words, not until it gets below the snow-line, that it is formed into ice. Above the snow-line we find snow, compressed snow, and below it we find ice, namely the Glaciers. This then is the way in which Glaciers are formed. The next point I would have you observe is that glaciers are rivers—literally rivers, and rivers of ice; and further, that they obey with very slight modifications the same laws that rivers obey; and perform with slight modifications the same work that rivers perform. As many rivers spring from the watershed, so from the snow plateaux on the snow-clad mountains do many glaciers spring. And these glaciers, by their own weight and the pressure from above, very slowly, but quite perceptibly, descend. The Glacier follows the bends of its valley, as the river does those of its bed; it contracts when it has to pass through a gorge, it expands when it has to fill a valley. As a river is fed by many tributary rivers, so a glacier is fed by many small glaciers. Again, as rivers have their waterfalls and torrents, so glaciers have their ice-cascades; and finally, as in rivers, the centre moves more rapidly than the sides, which are retarded by the friction of the valley-banks.

Glaciers always gather into themselves stones and rocks from the mountains that border on their valleys, and they often receive additional burdens of stones from the summits, whence large fragments are constantly falling down, either shattered by lightning or split by the frost: accordingly there is down each side of every glacier, what is called a *moraine*, *i.e.*, a line of rocks and stones that move with it. In due time the glacier receives a tributary, which also has two moraines down its sides; then the two moraines, which are adjacent, meet when the glaciers meet and flow on with it down the middle of what may be called the main stream; the other two moraines still keep on down each side of the main stream. Hence every glacier has two lateral moraines, *i.e.*, down the side, and as many medial moraines as it has received tributaries. Many of these rocks and stones are engulfed in the crevasses and fissures in the ice, which are caused by the uneven bottom, and windings of the valleys. Those stones that remain on the top still keep their angular and rough character, while those that fall into the glacier, generally fall through into the river that runs beneath most of the glaciers, and like all water-rolled pebbles, become rounded and smooth. The rivers that run under the glaciers arise partly from Springs, and partly from the melting of the ice. If the rocks in the stream are at all large they are generally caught up again by the glacier, and so go on scratching and grooving the rocks below them, and being scratched and grooved by them. And further the whole weight of the glacier grinds down and rounds off the surface of the rock beneath, so that we can always see where a glacier has been.

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The rocks that are so worn are called *mammillated*. Sometimes like the islands in a river, huge crags will rise in the midst of a glacier, and if the surface of the glacier sinks in course of time, they will often remain crowned with some fragment of rock that they have caught from the moraine of the glacier; and this rock remains perched on the top of the other where nothing but a glacier could have placed it. When the glacier arrives at the valley the sun's rays melt the ice as fast as it is pushed down, so only the stones of the moraines are left, these form what is called the terminal moraine through which the stream that flows from under the glacier takes its course. These terminal moraines are generally very large and contain immense rocks. The glaciers themselves are very large; many of the Swiss ones are 20 miles long, 2 or 3 broad, and 500 or 600 feet deep. The Humboldt Glacier of Greenland is 45 miles broad. I have mentioned that the stream flowing from under the glacier continues to flow on through the terminal moraine; these streams continue to flow on some into rivers, and some become rivers themselves; the Rhone, for instance, flows from a glacier. These streams are of course always very cold, and the Rhone is especially so as it flows direct from a glacier. When bathing in the lake of Geneva I found that the water would for about 3 yards be almost hot from the sun, and then for the next 3 yards perhaps it would be icy cold, from the fact that the Rhone was flowing through it. The passing from hot to cold, and *vice versâ*, when swimming was very curious; sometimes the shoulders and all the upper part of the body would be quite hot and all the rest quite cold.

I visited two glaciers in the past summer the Rosenlani glacier, and the Upper Grindelwald glacier.

The first of these two has been called the most beautiful glacier in all Switzerland, though it is by no means the largest. We rode from Meyringen in the morning, up one of the most beautiful of mountains, the Great Scheidech; for the greater part of the way we met no one, but, as we were a lively party, it did not matter much. The sides of the mountain are covered with the beautiful little rhododendron tree, improperly called the "Rose des Alpes," [almost the first thing I can remember is two of these little trees in the garden at home, which my father had brought from Monte Rosa, one of them having saved his life on that mountain].

About noon we stopped at one of the hotels that occur at intervals on all the much-frequented Alps; here we left our horses, and diverged for a short distance to visit the *Rosenlani Glacier*. We walked for some distance, through the rankest profusion of ferns, flowers, and the Rhododendron trees, and despite the heat we were all glad of an opportunity to stretch our limbs. I must not omit here the beautiful blue Gentian, which is the belle of all Alpine flowers. We presently came to a small wooden bridge over a very

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narrow chasm. Narrow though it was, we could hardly see the stream which dashed along the bottom, for the depth was enormous, there we found a man waiting, whose business it was to throw huge stones down from the bridge to amuse travellers, for which he expected a franc. We soon came to the terminal moraine of the glacier through which we found a beaten path; before we had gone 200 yards through the moraine we came to a Swiss chalet, full of the Swiss carvings, which you see everywhere through Switzerland, and of the rock-crystals. Having passed this we went on for 300 or 400 yards more through the moraine, and then came to the glacier. When we were still about 100 yards from it the air became quite cold, instead of opressively hot as we had hitherto found it.

Hence we proceeded to the place where the glacier-stream flowed from under it; we found it coming out of a sort of cave in the ice: into this cave we went, and very beautiful it was. The stream came flowing down through it, and the roof above, was ornamented with beautiful stalactites of ice. We went some way up the stream under the ice; it is possible to go right through and come out again higher up, but we did not—I climbed up on to the glacier for a little way, and I found the ice was not smooth and clear as I expected, but all granulated and rough and full of little bubbles about the size of a pea. These crunched at every step. When we returned again to the chalet, I had my alpenstock marked, as is the usual custom wherever you go in Switzerland. We then went on to the hotel where we had left our horses, and having had lunch, went on to *Grindelwald*.

The next day we visited the *Upper Grindelwald* glacier. The difference between this and the previous one was, that in this there had been a long passage cut through the ice, that after many windings ended in a grotto—inside this passage the ice was beautifully clear, and we could see for two or three yards into the glacier.

The dangers of crossing, which are great, are chiefly the following:—

First, the glacier, as I told you is always full of deep, and often, broad chasms, of which some are said to be not less than 500 or 600 feet deep. There is great danger of slipping into these, as the ice, as you all know, does not afford the firmest of footing, even though the men wear *crampons* upon their boots; these crampons are small iron bars with 4 small iron spikes in them. They also carry the *alpenstock*, which is a stout pole with an iron spike at one end; the use of it is to aid you in walking, and also should you slip into a chasm, to hold out horizontally above your head; when, if the chasm is not a broad one, it will often save you. Sometimes you see the tops of the alpenstocks ornamented either with a chamois horn, or with a bunch of the rhododendron flowers.

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These great crevasses often get slightly frozen over, by a thin coating of snow; this entirely hides them, so that you may be precipitated into them unawares. Generally, however, the snow about the crevass is much whiter than the rest of the glacier, so you have only to probe it with your alpenstock to see if it is sound or not. When there has lately been a snow-storm, the whole glacier is equally white, and then the danger is much greater. The men tie themselves together with ropes, so that if one falls in, he may be held up by the others.

Another great danger lies in the uneven surface of the glaciers. In some places the descents are so steep, that the only way of getting down is by what is called *sliding*, that is, stooping down and spreading the legs out, and keeping your alpenstock between your legs, behind you, to guide yourself with. There is also another method of *sliding*, viz., putting the two feet close together, and leaning backwards, supporting yourself by your alpenstock. This is the most usual way with travellers, while the natives patronise the other. Very often the slope has only a very small level ridge between it and a chasm some 200 or 300 feet deep. In such cases the way is to stop yourself by sticking the point of the alpenstock in the ice just at the bottom of the slope. I met a gentleman at Geneva who had broken his arm when descending one of these slopes. There had, he told me, been a party of them crossing the glacier, when they had to descend a slope of this sort. They all began to descend in the second manner which I mentioned, and my friend happened to be a little ahead of the rest; when he got near the bottom he saw that there was only a level ridge of about 3 or 4 feet wide, for them to land on, and that between this and the chasm were only a few stones and lumps of ice; accordingly, when he came to the ledge, he threw himself flat down upon the ice and so succeeded in stopping himself: but the whole of the rest of the party came tumbling on the top of him and broke his arm.

The author of "Frost and Fire" has given the following account of a slide down a snow slope. As it can give you a better account than anything I can tell you, I will quote it. He says,

"Now came the descent on the other side. It was not nice going, but following my hunter I got down, and the rest followed us. We scrambled down several broken scaurs, and halted at the top of a snow-slope. It seemed to slant down several thousands of feet till it reached the level of the Grindelwald glacier. I funked desperately, but there was nothing for it but follow my leader. So planting my feet together, and holding the pole behind, I let myself go, and glided down about 300 yards. Here was a bare rock, so we dug the points of our sticks into the snow, and sat down to watch the others. They looked like pigmies craning over the edge. First came the German, and reached the first stone all right; then came the Dane, who lost his footing,

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and performed the rest of the journey on his foundation; last came the Russ, who fell flat on his back, and lost his stick and his hat. He might have lost his life also, but for a lucky stone which brought him up. He was too much shaken to try again, so two men took him under the arms for the rest of the way. The hunter cut snooks, cheered, made himself into a tripod again, and started, I followed as best I could, and reached the bottom, hot, but charmed with this new method of travelling. The dandy came in terribly dilapidated; his face was pale, his hands skinned in trying to hold back, his shirt-bands were torn, the heels of his Wellingtons had gone to one side, and his knees shook. So we all sat down and ate and drank vigorously." So you see sliding is not always so pleasant as it looks. On the 28th of February, 1864, a fatal accident happened in the Vallias. A party were sliding down a snow-slope, they moved it and it slid with them, and two were killed in the avalanche.

Another thing to notice is that glaciers all move, and move regularly. I told you that the causes which move them are pressure, slope, and temperature. As to the rate at which they move, M. Ebal states, that in the valley of Chamouni, they travel at about 14 feet a year, while in that of Grindelwald the rate is at about 25 feet a year. This is to be attributed probably to the difference in slope of the ground. The same glacier also will make more progress in one year than in another according to the lesser or greater warmth of the summer of that year. Captain Hall mentions the ploughing up of the ground before the glacier as an obvious proof of its progression. He instances the Benva glacier, which fairly crosses from one side of the valley to the other, and is so irresistibly pressed forward by the weight of snow on its shoulders, that on reaching the opposite side of the valley it travels a considerable distance up the bank.

But they move so regularly, that when, some years ago, a fatal accident happened on one of them, in which three men fell into a crevass and perished, it was calculated by an English professor, that their bodies would appear at the end of a fixed stated period, and sure enough, within a week of the time he had foretold, an arm was seen, shortly afterwards a leg, and soon all the bodies, which were identified by their clothes.

This motion of glaciers gives rise to the extraordinary spectacle, of summer productions and winter formations being sometimes in immediate contact with each other; the ice-field obtruding into flowery meadows, and gradually forcing its way into the regions of cultivation. According to Professor Forbes, the very huts of the peasantry are sometimes invaded by this moving ice, and many persons now living have seen the full ears of corn touching the glacier, and have gathered ripe cherries from the trees with one foot standing on the ice!

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The glacier system of the Alps embraces an extensive area. M. Ebal estimates that there may be at least 400 of the larger glaciers, *i.e.*, those varying from 3 to 30 miles in length. The aggregate superficial extent of all those of the Tyrol, Switzerland, Piedmont, and Savoy, is calculated to be not less than 1400 square miles. The greatest breadth of any single one is seldom more than two miles. The thickness varies from 100 to 600 feet.

So then if you were travelling in a country you knew or suspected to have once been subject to the action of land-ice, whether in a small scale, as in the valley-glaciers of Norway and Switzerland, or on a large scale as now in Greenland, where the whole country is, as it were, covered with one great sheet of ice, the signs you should look for would be the following :

α *Mammillated rocks* or, as the French call them, *roches moutonnées*, rocks rounded off by the superincumbent pressure and grinding weight of ice.

β *Blocs perchés* or rocks perched on the tops of others—rocks that are evidently not native to the place where they are found, and where they could not have rolled down to their present position from the heights above (for then they would have bounded on), and where no human skill could have balanced them; but which have evidently been let gently down by ice.

γ *Moraines*, whether lateral in the shape of stones along the slopes of mountains, marking the edges of old glaciers, or terminal in the shape of heaps of stones, deposited at the foot of the glacier, and too large to be carried away by the glacial stream.

δ *Grooves, chisellings, and markings* in the rock, of every depth, size, and character, from the mere scratch to the decided hollow.

It is to be noticed that all these markings and signs are found to this day in a great many countries where there are no glaciers at all, *e.g.* in Scotland and Wales.

I cannot conclude better than with some lines from Coleridge :

Motionless torrents! silent cataracts!
Who made you glorious as the gates of heaven
Beneath the keen full moon? who bade the sun
Clothe you with rainbows? who with living flowers
Of loveliest blue spread garlands at your feet?
God! let the torrents, like a shout of nations,
Answer! and let the ice-plains echo, God!
God! sing, ye meadow-streams, with gladsome voice!
Ye pine-groves, with your soft and soul-like sounds!
And they, too, have a voice, yon piles of snow,
And in their perilous fall shall thunder, God!

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There were 68 persons present—17 members, 6 honorary members, and 45 visitors.

MEETING HELD NOVEMBER 15TH, 1867.

Entomology.

H. M. HILTON gave a list of notices, and exhibited a flint sponge, with cavities filled with living specimens of the perfect insect of the rat-tailed maggot *(Helophilus pendulus)*; also nests of the rose-leaf-cutter bee.

Archæology.

G. G. MONCK exhibited some Roman coins found at Pagan's Hole near Bristol, presented to the society by J. C. Brown; a silver denarius of Antoninus Pius, and various other coins.

THE PRESIDENT exhibited a carved walking-stick made from the oak of York Minster.

Geology.

E. ALMACK gave a short description of the orgin of the "grey wethers," and exhibited a specimen of echinus, embedded in flint.

A lecture, illustrated by numerous diagrams and experiments, was then given by W. Fergus, Esq., M.D., on the Ear.

There were 111 present—4 hon. members, 26 members, and 81 visitors.

MEETING HELD NOVEMBER 29TH, 1867.

Archæology.

G. G. MONCK exhibited some coins, among them two Japanese coins, and a rare silver coin belonging to the late Rebel Government in China; also a Japanese box made of straw.

Geology.

W. GREG exhibited some lava from Teneriffe.

Botany.

THE PRESIDENT exhibited the fruit of the prickly pear, a cocoa-nut in the husk, and a double cocoa-nut (*Lodoicea Seychellarum*) from the Seychelles.

H. M. MOULE, Esquire, then gave a lecture on "Corfe Castle and the Isle of Purbeck."

There were 113 persons present—20 members, 5 hon. members, and 88 visitors."

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MEETING HELD DECEMBER 13TH, 1867.

Ornithology.

G. H. HOLDEN exhibited seven birds, British and Foreign, presented to the Society by J. W. Parrington.

THE PRESIDENT presented a blue-throated warbler, and exhibited some birds' nests, built of Cud-weed, from Spain.

Entomology.

H. M. HILTON exhibited some Cingalese insects, presented to the Society by A. R. Wiggin.

Zoology.

THE PRESIDENT exhibited some curious oyster-shells, presented by H. H. A'Court.

E. ALMACK exhibited the skull of a bear.

Geology.

E. ALMACK exhibited some fossil bones from the drift in Berkshire.

Botany.

THE PRESIDENT exhibited some minute cocoa-nuts (*Micrococos chiliensis*) from Chili, about the size of ordinary walnuts; also Betel nuts from Siam, Ceylon, and India, together with shell-lime and Sipsiet for eating with them; likewise the capsule of the Brasil nut.

THE PRESIDENT then gave a lecture on "meteorites," illustrated by diagrams, and a large collection of meteorites, kindly lent for the purpose by Mr. J. R. Gregory.

The heads of sections then gave abstracts of their several reports.

G. H. HOLDEN then read the following summary:—

	1867.	Corresponding half-year of 1866.
Number of ordinary meetings.....	8	8
Number of papers read	7	7
Number of exhibitions.....	97	100
Average number of exhibitions per meeting	12·1	12·4
Average number of persons present	31·3	41·3
Average number of visitors present	57·4	24

There were 99 persons present—22 members and 77 visitors.

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ENTOMOLOGICAL NOTICES.

The following list is necessarily small, as the School only returned on August 16th; but, nevertheless, a very fair amount was done in the first few weeks of the half-year.

The late dates here recorded of the capture of some few Lepidoptera, whose usual time of appearance is July and the beginning of August, are accounted for by the absence of the School during the time mentioned.

A great number have joined the Entomological section lately, it is only to be hoped that they will shew a good deal of energy in the approaching season.

The names of those whose initials occur in the following list are:—

F. F. B..... F. F. Back.
F. J. C. B..... F. J. C. Boles.
F. W. B..... F. W. Bourdillon.
L. C. ..... L. Chapman.
C. J. C. ..... C. J. Cole.
J. W. D. ..... J. W. Dudding.
J. B. F..... J. B. Fuller.
J. H. ..... J. Hamilton.
A. C. H..... A. C. Hilton.
H. M. H. ..... H. M. Hilton.
C. I..... C. Irwin.
F. J. H. J..... F. J. H. Jenkinson.
A. L. ..... A. Longmore.
G. F. R. ..... G. F. Ruck.
H. M. ..... H. Manders.
G. C. M..... G. C. Manisty.
J. B. O..... J. B. Oakeley.
F. P. ..... F. Playne.
C. A. S..... C. A. Sladen.

Latin Name.	English Name.	Date.	Captor.
	RHOPALOCERA.		
Colias Edusa	Clouded Yellow ...	Aug. 30	C. A. S.
Argynnis Aglaia	Dark Green F. ...	Aug. 21	J. B. F.
Thecla Quercus	Purple Hairstreak (seen)	Aug. 21	F. J. H. J; A. C. H.

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HETEROCERA.

Latin Name.	English Name.	Date.	Captor.
SPHINGINA.			
Smerinthus Ocellatus ...	Eyed Hawk (larva)	Sept. 1	J. B. F.
S. Populi...	Poplar H. (do.)	Aug. 31	J. B. O.
S. Tiliæ	Lime H. (do.)	Aug. 20	J. B. F.
Sphinx Ligustri	Privet H. (do.)	Sept. 1	F. W. B.
Chærocampa Porcellus	Small Elephant (do.)	Sept. 1	J. W. D.
BOMBYCINA.			
Orgyia Antiqua	Vapourer	Sept. 5	F. J. H. J.
Diloba Cœruleocephala...	Figure of 8... ...	Sept. 9	Morse.
NOCTUINA.			
Bryophila Perla	Marbled Beauty ...	Aug. 24	G. C. M.
Acronycta Alni	Alder Moth (larva)	Aug. 27	L. C.
Heliophobus Popularis ...	Feathered Gothic	Sept. 3	F. P.
Agrotis Suffusa		Aug. 26	F. J. H. J.
Triphæna Janthina ...		Aug. 28	F. J. H. J.
Anthocelis Lunosa ...	Lunar Underwing	Sept. 28	C. L.
Gonoptera Libatrix ...	Herald Moth ...	Sept. 10	C. A. S.
GEOMETRINA.			
Epione Apiciaria		Aug. 30	J. B. O.
Ennomos Tiliaria			F. J. C. B.
E. Angularia		Aug. 19	A. C. H.
Strenia Clathrata		Aug. 27	A. C. H.
Hibernia Progemmaria...		Oct. 28	A. L.
Cheimatobia Brumata		Nov. 16	J. B. O.
Eupithecia Centaureata		Aug. 24	A. C. H.
Phibalapteryx Polygrammata		Sept. 1	F. J. H. J.
Scotosia Dubitata		Aug. 29	C. T. C.
Cidaria Immanata		Aug. 24	A. C. H.
PYRALIDINA.			
Pyralis Farinalis		Aug. 17	
Botys Verticalis		Aug. 19	H. M. H.
Aphomia Colonella...		Sept. 1	F. J. H. J.

NEW SPECIES.

The two following are new to the College list. The 'Stainton' numbers are prefixed, as they are not to be found in our Calendar.

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182	Trichiura Crataegi	Sept. 9	Bred by F. J. H. J., from a pupa found by G. F. R.
208	Cymatophora Diluta	Sept. 12	Taken in Manton Coppice by L. C.

LATEST APPEARANCES.

Vanessa Atalanta... ...	Red Admiral ...	Oct. 29	C. A. S.
V. Urticæ	Small Tortoiseshell	Nov. 3	J. H.
Gonepteryx Rhamni ...	Brimstone B. ...	Nov. 8	H. M.
Vanessa Io	Peacock B.... ...	Nov. 10	C. A. S.
Macroglossa Stellatarum	Humming Bird H.	Oct. 23	J. W. D.
Phlogophora Meticulosa	Angle Shades ...	Dec. 13	F. F. B.

BOTANY.

During the earlier part of the half-year a very fair amount of work was done; two, if not three, new species were added to our list, and a very considerable number of new localities. The subjoined list gives only the more important notices. Plants continued in flower till the beginning of November, but by the end of the first week of that month most of them had been killed by the frost.

Names of those whose initials are given in the list.

G. H. D.	G. H. Dawson.
W. F.	W. Fergus, Esq., M.D.
J. E. H.	J. E. Hilliard.
A. C. H.	A. C. Hilton.
H. M. H.....	H. M. Hilton.
A. P. H.	A. P. Hookin.
F. R. J.	F. R. Jarvis.
F. J. H. J.	F. J. H. Jenkinson.
J. B. O.	J. B. Oakeley.
J. C. P.	J. C. Palmer.
T. A. P.	Rev. T. A. Preston.
G. F. R.	G. F. Ruck.
E. im. T.	E. im Thurn.

NEW SPECIES.

Blue Flea-bane (Erigeron acris), Downs near Dead-man's copse. Sept. 8, G. F. R.

Wild Garlic (Allium oleraceum) side of the Bath road, near the Turnpike Aug. 25, G. F. R.

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Borage (Borago officinalis) near Elcot Mill, (probably an escape).

S. B. Dixon, Esq., jun., has also presented specimens of

Lastrea Borreri, from Draycott Copse, near Pewsey.

Lastrea Thelypteris, from Manningford Bruce, near Pewsey, Oct. 1867.

NEW LOCALITIES.

Wild Mignonette	Reseda lutea	Between Four and Five-mile Clumps, Sep. 11, A.C.H. and H. M. H.
Dwarf Mallow ...	Malva rotundifolia... ...	Mildenhall; East Kennett, T. A. P.
Wood Vetch ...	Vicia sylvatica	Wood by Martinsell, Sept. 4, H. M. H.
Agrimony	Agrimonia odorata ...	Ivy's Farm, Aug. 30, T. A. P.
Rose-Bay	Epilobium angustifolium	Wood by Martinsell, Sept. 4, H. M. H.
Enchanter's Nightshade	Circæa lutetiana	Stone-bridge Lane, Marlborough, T. A. P.
Teasel	Dipsacus sylvestris ...	Poulton, Aug. 20, T. A. P.
Corn Chamomile	Anthemis arvensis ...	Ivy's Farm, Aug. 30, E. im T.
Stinking do. ...	Anthemis cotula	Ivy's Farm, Aug. 30, T. A. P.
Dwarf Cudweed	Gnaphalium uliginosum	Ivy's Farm, Aug. 30, T. A. P.
Chicory	Cichorium intybus ...	Martinsell, Aug. 20, J. B. O. and F. R. J.; Railway, near Ivy's Farm, Aug. 30, E. im T.
Nettle-leaved Bell-flower	Campanula trachelium...	Forest Hill, Sept. 12, A.C.H. and H. M. H.
Viper's Bugloss ...	Echium vulgare	Railway near Ivy's Farm, Aug. 30, E. im T.
Water Bistort ...	Polygonum amphibium	Water meadows, Poulton, Aug. 20, J. C. P. and E. im T.
Ladies' Tresses ...	Neottia spiralis	Between Four and Five-mile Clumps, Sep. 11, A.C.H. and H.M.H.
Toad-Rush	Juncus bufonius	Elcot Mill, Aug. 30, E. im T.
Bulrush	Scirpus lacustris	Mildenhall, T. A. P.
Common Spleenwort	Asplenium trichomanes	Wall of St. Peter's Church, Marlborough, G. F. R.

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OTHER NOTICES.

Water Crowfoot...	Ranunculus heterophyllus	fl. Aug. 21, E. im T.
Soapwort	Saponaria officinalis ...	only in bud Aug. 20, E. im T.
Wood Vetch ...	Vicia sylvatica	fl. Aug. 28, West Woods, A. P. H. and J. E. H.
Strawberry	Fragaria vesca	fl. Nov. 5, E. im T. and J.C.P.
Barren Strawberry	Potentilla fragariastrum	fl. Nov. 4, E. im T.
Raspberry	Rubus Idæus	fl. Oct. 25, W. F.
Pear (cultivated)		fl. Sept. 22, Mrs. Bradley.
Apple (cultivated)		fl. Sept. 22, G. H. D; Oct. 25th, W. F.
Ivy	Hedera helix	fl. by Sept. 11, T. A. P.
Bur-Marigold ...	Bidens cernua	fl. Oct. 1, E. im T.
Corn Marigold ...	Chrysanthemum segetum	fl. Sept. 24, E. im T.
Felwort	Gentiana amarella... ...	very few fl. out, Aug 20.
Field Gentian ...	Gentiana campestris ...	only young buds, Aug. 30, E. im T.; Marlborough Common, Sep. 6, T.A.P.
Black Mullein ...	Verbascum nigrum ...	first fl. Aug. 21, F. J. H. J.
Red Rattle	Pedicularis sylvatica ...	Sept. 30, E. im T.
Primrose	Primula vulgaris	Sept. 11, T. A. P.
Cowslip	Primula veris...	fl. Nov. 5, E. im T. and J.C.P.
Colchicum	Colchicum autumnale ...	fl. Aug. 28, A. P. H. and J. E. H.
Arrow-grass ...	Triglochin palustre ...	not visible where it was plentiful last year.

TREES LEAFLESS.

Lime	Oct. 20.
Horse Chestnut...	Oct. 27.
Hawthorn	Nov. 12.
Pear	Oct. 26.
Red Currant	Oct. 26.
Ash	Oct. 25.
Field Elm	Oct. 28th to Nov. 12.
Lombardy Poplar	Oct. 29.
Oak	Nov. 12.

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ORNITHOLOGICAL NOTICES.

Fieldfare	...	...	seen	...	September 29th	E. im Thurn.
Swallow	...	...	seen	...	November 16th	G. H. Dawson.

NEW SPECIES.

Since the publication of the list of the birds mentioned in the "Flora of Marlborough," four or five years have passed, in the course of which several birds have been observed in this neighbourhood. The following is the list of those additional notices which we have been able to obtain.

1.—White-tailed Eagle, one shot in Savernake Forest in 1859.
2.—Rough-legged Buzzard, one caught at Overton in 1866.
3.—Peregrine Falcon, said not to be uncommon on the Downs.
4.—Hen Harrier, one shot in Savernake Forest in 1862.
5.—Common Buzzard, several specimens observed in 1865.
6.—Common Kite, a pair built for some years at the same place, on the further side of Martinsell.
7.—Golden Plover, visits us in severe winters.
8.—Green Sandpiper, several flocks observed in the neighbourhood.
9.—Grey Phalarope, one shot at East Kennet in 1866.
10.—Lesser black backed Gull, occasionally met with.
11.—Arctic Tern, observed on the canal at Savernake.
12.—Golden Eye, one specimen shot at Mildenhall.
13.—Widgeon, not uncommon.
14.—Bohemian Waxwing, observed at Draycot in 1864.
15.—Red-necked Grebe, one obtained at Preshute some years ago.
16.—Little Auk, one shot on the Kennet in 1864.
17.—Greater spotted Woodpecker, not uncommon.

Besides these there is one bird, the great Bustard, which we may claim as having once belonged to our Marlborough list, though it has in all probability become extinct, we may almost say in England, for many years. In a paper read before the Wilts Archæological Society, are recorded the two last instances of its occurrence in this neighbourhood, one in Savernake Forest in the year 1849, the second two years later at Chiseldon. There are also two birds, which, it is to be feared, are completely lost to us, the Raven and the Nightingale.

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MUSEUM REPORT.

GEOLOGICAL COLLECTION.

This has been enriched by a valuable collection of fossil fish, from the Orkneys, some relics from a Pict's house in the Orkneys, both by J. B. Gilmore, Esq., and a collection of fossil sponges by the late W. Bartlett, Esq.

MINERALOGICAL COLLECTION.

In order to complete a good representative collection, the following minerals are required—Meteoric Iron, Meteorite, Copper Nickel, Radiated Pyrites, Rocksalt (crystallised), Emery, Ilmenite, Cervantite, Zircon, Scapolite, Epidote, Lepidolite, Leucite, Glassy Feldspar, Graphic Granite, Kaolin, Petalite, Lievrite, Meerschaum, Allophane, Scheelite, Wulfenite, Wolfram, Alunite, Websterite, Apatite.

Towards the cost of these F. Storr, Esq., has given 5s.

ENTOMOLOGICAL COLLECTION.

The collection of Moths and Butterflies has been enriched by a donation of specimens from the Rev. J. Greene—with that exception there have been but few additions. In accordance with a wish expressed by many kind Friends a list of our desiderata is given below. In order to prevent this list being too long, none but the names of those species of which we have no representative are mentioned, and even these only to the end of the Noctuæ. As there are but few complete series, almost any specimens will be acceptable.

BUTTERFLIES.

Colias Hyale
Pieris Daplidice
Vanessa Antiopa
Argynnis Lathonia
Melitæa Athalia
Thecla Pruni
Chrysophanus Dispar
" Chryseis
Polyommatus Acis
" Arion
Steropes Paniscus
Pamphila Actæon

SPHINGES.

Procris Globulariæ
Sphinx Pinastri
Deilephila (all)
Chærocampa Nerii
" Celerio
Sesia Bombyliformis
Sphecia Bembeciformis

and all the Trochiliums, except Tipuliforme, Myopseforme and Formicæforme.

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BOMBYCES.

Hepialus Sylvinus
Cerura Bicuspis
" Bifida
Notodonta Dromedarius
" Tritophus
Ptilophora Plumigera
Drymonia Dodonæa
" Chaonia
Gluphisia Crenata
Leiocampa Dictæoides
Diloba Cæruleocephala
Peridea Trepida
Pœlura Monacha
Hypogymna Dispar
Dasychira Fascelina
Leucoma Vau-nigrum
Lithosia Aureola
" Pygmæola
" Muscerda
Nudaria Senex
Spilosoma Papyratia
Eulepia Grammica
" Cribrum
Deiopeia Pulchella
Lasiocampa Trifolii
Eriogaster Lanestris
Clisiocampa Castrensis
Platypteryx Lacertinaria
Drepana Sicula
Psyche (all)

NOCTUÆ.

Cymatophora Duplaris
" Fluctuosa
" Diluta
" Ocularis
" Ridens
Acronycta Tridens
" Leporina
" Strigosa
" Alni
" Salicis
" Myricæ
Synia Musculosa
Leucania Vitellina
" Straminea
Melania Flammea
Senta Ulvæ
Nonagria Despecta
" Concolor
" Helmanni
" Cannæ
" Typhæ
„ Crassicornis
Hydræcia Petasitis
Axylia Putris
Xylophasia *Lithoxylea*
" Scolopacina
Xylomyges Conspicillaris
Laphygma Exigua
Neuria Saponariæ
Pachetra Leucophæa
Luperina Dumerilii
Mamestra Anceps
" Furva
Apamea Connexa
" Gemina
" Ophiogramma
„ Fibrosa
Miana Expolita
Hydrilla Palustris
Caradrina Alsines
Agrotis Fennica
" Corticea
" Ripæ
" Obelisca

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Agrotis Agathina
" Ashworthii
Triphæna Subsequa
Noctua Depuncta
" Rhomboidea
" Sobrina
Taeniocampa Leucographa
Ortohosia Suspecta
Cerastis Erythrocephala
Hoporina Croceago
" Aurago
Cirrœdia Xempelina
Tethea Retusa
Euperia Fulvago
Cosmia Pyralina
Eremobia Ochroleuca
Dianthœcia Cucubali
" Albimacula
Hecatera Dysodea
Epunda Lutulenta
" Nigra
Valeria Oleagina
Miselia Bimaculosa
Hadena Satura
" Assimilis
" Rectilinea
Cloantha Perspicillaris
Xylina Rhizolitha
" Petrificata
Cucullia Scrophulariæ
" Absinithii
" Chamomillæ
Calophasia Linariæ
Charicles Delphinii
Heliothis Peltigera
" Armigera
" Scutosa
Anarta Melanopa
Acontia Luctuosa
Erastria Venustula
" Fuscula
Micra Ostrina
Brephos Notha
" Bractea
Plusia Illustris
Ophiodes Lunaris

BOTANICAL COLLECTION.

No further additions have been made to the collection. Among the more important desiderata may be mentioned Ranunculus floribundus, Glaucium violaceum, Draba rupestris, Polygala uliginosa, Moenchia ciliata, M. saxatilis, Arenaria norvegica, Stellaria cerastoides, Medicago sylvestris, Trifolium Molinerii, T. glomeratum, Rosa Wilsoni, R. involuta R. Sabini, R. sepium, Epilobium rosmarinifolium, Saxifraga cæspitosa, S. affinis, Astrantia major, Œnanthe silaifolia, Œ. fluviatilis, Tordylium maximum, Daucus maritimus, Coriandrum sativum, Galium Anglicum, Fedia carinata, Sonchus palustris, Arnoseris pusilla, Carduus Forsteri, Centaurea nigrescens, Gnaphalium norvegicum, Filago apiculata, Senecio paludosus, Cineraria palustris, Menziesia cærulea, Verbascum floccosum, V. Blattaria, Veronica verna, Orobanche caryophyllacea, O. amethystea, O. Picridis, Teucrium Scordium, Lamium intermedium, Galeopsis ochroleuca, Pinguicula alpina, Utricularia, intermedia Cyclamen hederæfolium, Statice binervosa, Chenopodium urbicum, C. botryodes, C. glaucum, Rumex Pratensis, Euphorbia Stricta, Spiranthes cernua, Epipactis media, Epigogium aphyllum, Orchis laxiflora, O. militaris,

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O. tephrosanthos, Ophrys aranifera, Liparis Loeselii, Cyprepedium Calceolus, Sisyrinchium anceps, Allium Babingtonii, A. Scorodoprasum, A. Schœnoprasum, Convallaria Polygonatum, Potamogeton flabellatus, P. gracilis, P. longifolius, P. heteropyllus P. oblongus, Zostera nana, Sparganium minimum, Juncus diffusus, J. biglumis, Scirpus carinatus, S. triqueter, S. Watsoni, S. parvulus, Carex curta, C. Vahlii C. canescens, Phleum asperum, Arundo stricta, Glyceria Borreri Poa laxa, P. cæsia, Festuca arundinacea, Woodsia ilvensis.

ORNITHOLOGICAL COLLECTION.

During the last few months some important additions have been made to the Society's collection of birds. This having been fairly set on foot, and a commodious cabinet having been purchased for the preservation of the specimens, it is hoped that others may be induced to follow the example of several very liberal Donors. Though there are obvious advantages in having the specimens properly stuffed and set up, yet for several causes, principally on account of the great expense incurred, it has been determined, for the present at least, to preserve merely the *skins* of the majority of the birds. These will therefore be as welcome as stuffed specimens, though there is now accommodation for the careful preservation of the latter.

The collection at present consists of specimens of the following birds :—

Falco Tinnunculus ...	Kestrel (2)	E. im Thurn
Falco Nisus	Sparrow Hawk (2) ...	E. im Thurn G. H. Dawson
Falco Rufus	Marsh Harrier ...	E. im Thurn
Strix Aluco	Tawny Owl (2) ...	Rev. J. F. Bright
Strix Flammea ...	Barn Owl (2)	Rev. J. F. Bright
Strix Otus	Long-eared Owl ...	Rev. T. A. Preston
Corvus Corax	Raven	J. B. Gilmore, Esq.
Corvus Frugilegus ...	Rook (2)	Rev. J. F. Bright E. im Thurn
Garrulus Pica	Magpie (2)	Rev. T. A. Preston
Garrulus Glandarius ...	Jay (2)	Rev. T. A. Preston
Sturnus Vulgaris ...	Starling (2)	Rev. J. F. Bright
Lanius Colurio ...	Redbacked Shrike ...	Rev. J. F. Bright
Turdus Viscivorus ...	Missel Thrush (2) ...	E. im Thurn
Turdus Pilaris	Fieldfare (2)	E. im Thurn
Turdus Musicus ...	Song Thrush (2) ...	E. im Thurn
Turdus Iliacus	Redwing (2)	E. im Thurn
Turdus Torquatus ...	Ring Ouzel	Rev. T. A. Preston
Turdus Merula	Black Bird	Rev. J. F. Bright
Sylvia Suecia	Blue throated Warbler ...	Rev. T. A. Preston
Sylvia Phœnicurus ...	Redstart	J. W. Parrington

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Sylvia Trochilus ...	Willow Warbler ...	Rev. J. F. Bright
Regulus Cristatus ...	Golden-crested Wren (2)	Rev. T. A. Preston
Troglodytes Vulgaris ...	Common Wren (2) ...	Rev. J. F. Bright
Accentor Modularis ...	Hedge Accentor (2) ...	Rev. J. F. Bright
Parus Cæruleus ...	Blue Tit (2)	Rev. J. F. Bright
Emberiza Citrinella ...	Yellow Hammer (2) ...	Rev. J. F. Bright
Emberiza Nivalis ...	Snow Bunting	J. W. Parrington J. B. Gilmore, Esq.
PyrrhulaVulgaris ...	Bulfinch	Rev. J. F. Bright
Fringilla Coccothraustes	Hawfinch (2)	
Fringilla Cælebs ...	Chaffinch (2)	Rev. J. F. Bright
Fringilla monti-fringilla	Brambling (4)	Rev. T. A. Preston. Rev. J. F. Bright.
Fringilla Montium ...	Mountain Linnet (2) ...	J. B. Gilmore, Esq.
Fringilla Spenus ...	Siskin	J. W Parrington.
Fringilla Linaria ...	Common Redpole ...	J. W. Parrington.
Cuculus Canorus ...	Cuckoo (2)	Rev. J. F. Bright. J. W. Parrington.
Picus Viridis	Green Woodpecker (2) ...	Rev. J. F. Bright. E. im Thurn.
Sitta Europæa	Nuthatch	Rev. J. F. Bright.
Alcedo Ispida	Kingfisher (3)	Rev. J. F. Bright. G. H. Dawson.
Caprimulgus Europæus	Goatsucker	Rev. T. A. Preston. E. im Thurn.
Phasianus Colchicus ...	Common Pheasant (4) ...	Mr. G. Gauntlet.
Perdix Cinerea	Partridge	E. im Thurn.
Perdix Rubra	Red-legged Partridge (2)	E. im Thurn.
Hæmatopus Ostralegus...	Oyster catcher	J. B. Gilmore, Esq.
Charadrius Pluvialis ...	Golden Plover	J. B. Gilmore, Esq.
Charadrius Hiaticula ...	Ringed Plover (2) ...	J. B. Gilmore, Esq.
Vanellus Cristatus ...	Lapwing (2)	J. B. Gilmore, Esq. G. H. Dawson.
Ardea Cinerea	Common Heron... ...	Rev. T. A. Preston.
Ardea Stellaris	Common Bittern ...	Rev. T. A. Preston.
Fringa Variabilis ...	Dunlin (2)	J. B. Gilmore, Esq.
Fringa Maritima ...	Purple Sandpiper (2) ...	J. B. Gilmore, Esq.
Machetes Pugnax ...	Ruff (2)	Rev. T. A. Preston.
Totanus Calidris... ...	Common Redshank (2)	J. B. Gilmore, Esq.
Scolopax Gallinago ...	Common Snipe (2) ...	J. B. Gilmore, Esq.
Scolopax Gallinula ...	Jack Snipe (2)	J. B. Gilmore, Esq.
Rallus aquaticus... ...	Water Rail (2)	Rev. T. A. Preston
Crex-pratensis ...	Land Rail	E. im Thurn.

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Gallinula Chloropus ...	Moorhen (2)	Sergeant Haggis. Rev. J. F. Bright.
Fulica Atra	Common Coot	Rev. T. A. Preston.
Phalaropus Lobatus	Grey Phalarope	Mr. J. Coleman.
Sterna Arctica	Arctic Tern	E. im Thurn.
Larus argentatus	Herring Gull (2)	J. B. Gilmore, Esq.
Larus Marinus	Great black-backed Gull	J. B. Gilmore, Esq.
Larus Flavipes	Lesser black-backed Gull	J. B. Gilmore, Esq.
Larus Lanus	Common Gull	J. B. Gilmore, Esq.
Larus Tridactylus	Kittiwake	E. im Thurn.
Thalassidroma Procellaria	Storm Petrel (2)	J. B. Gilmore, Esq. J. W. Parrington.
Anas Acuta	Pintail duck	Rev. T. A. Preston.
Anas Fusca	Velvet Scoter (2)	J. B. Gilmore, Esq.
Mergus Serrator	Redbreasted Merganser(3)	J. B Gilmore, Esq. J. W. Parrington.
Carbo Cormoranus	Cormorant	J. B. Gilmore, Esq.
Calymbus Glacialis ...	Great Northern Diver ...	J. B. Gilmore, Esq.
Uria Troile	Guillemot (2)	J. B. Gilmore, Esq.
Uria Grylle	Black Guillemot (3) ...	J. B. Gilmore, Esq.
Mormon Fratercula ...	Puffin (2)	J. B. Gilmore, Esq.
Alca Torda	Razor Bill (2)	J. B. Gilmore, Esq.

ROMAN COINS.

PRESENTED BY J. C. BROWN,

A silver denarius of Antonius Pius
A copper coin of ditto
Ditto Faustina
Ditto Commodus
Two of the Republic, and seven of which the inscriptions are unintelligible.

ENGLISH COINS.

Shilling of Charles II (1668)
Ditto Anne (1711)
Silver threepence of George II (1740)
Penny of William and Mary (1601)
Silver sixpence of George II (1757)
Groat of Edward I, by Mr. C. Brampton
Ditto of Richard II

Silver coin of Louis XV (1757)

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	Mean height of Barometer.		Monthly range.		Mean temperature of air.		Mean daily range.		Maximum in shade.		Minimum in shade.		Maximum in Sun.		Minimum on Grass.		Mean degree of Humidity		Mean amount of Cloud.		Amount of Rain.		No. of days on which it fell.	
	1867	1866	1867	1866	1867	1866	1867	1866	1867	1866	1867	1866	1867	1866	1867	1866	1867	1866	1867	1866	1867	1866	1867	1866
	in	in	in	in	°	°	°	°	°	°	°	°	°	°	°	°					in	in		
JULY	29·432	29·483	0·996	0·976	58·3	59·4	19·0	18·2	77·6	83·2	39·2	40·3	134·5	139·8	32·0	31·2	78.0	76·1	6·9	6·8	4·046	1·574	19	12
AUGUST...	29·527	29·349	0·502	0·736	60·0	57.5	19·7	17·0	83.1	74·6	40·1	38·7	143.3	136·0	35.1	30·0	76.0	76·8	6·5	7.5	2·580	3·069	12	21
SEPTEMBER	29·617	29·262	0·740	0·852	56·1	54·1	16·1	12·3	76·7	70·7	32·4	37·1	131·6	119·3	29·2	27·0	82.2	90·4	7·1	8·3	2·324	7·068	15	29
OCTOBER...	29·458	29·625	1·000	0·810	49.0	51·0	15·9	11·8	66·6	67.6	28·1	30·2	109·8	119·0	20·4	24·0	87.8	89·0	7·2	7·9	3·548	1·793	25	16
NOVEMBER	29·838	29·498	1·113	1·022	39·7	44·0	15·7	13·6	58·4	57·9	20·6	25·6	97·3	97.8	12·8	18.8	84.9	87·2	6·4	7·1	1·493	3·102	7	18
DECEMBER	9·5 64	29·482	1.406	1·210	37.3	42·6	13·8	11·6	65·8	56.3	17 7	23·1	75·0	76·0	13·7	20·0	95·9	90·4	6·7	7·6	1·620	3·312	11	23
MEAN.....	29·573	29·418	0·959	0.934	50·1	51·4	16·7	14·1	...	...	...	...	...	...	...	...	84·1	85·0	6·8	7·5	...	...	...	...

Total amount of rain during the six months in 1867—15·611 inches; in 1866, 19·918 inches.
Total amount of rain during the year 1867—33·042 inches; in 1866, 38·052 inches.

ACCOUNTS.

Receipts.

	£	s.	d.
Balance from last half-year	4	6	6
Subscriptions	5	1	0
Donations	2	17	0
Ditto for Bird Cabinet...	2	16	9
Ditto for album	0	15	0
Ditto for minerals	0	5	0
Sale of Report—Midsummer, 1867.	27	16	0
Sale of Back Reports...	1	4	0
	£45	4	9

Expenditure.

	£	s.	d.
Banking book	0	0	6
Balance of Printing account, Midsummer ...	0	5	6
"Geologist"—6 months	0	6	9
Candles	0	6	0
Album	1	10	0
Pair of Hawfinches	0	4	0
Lower Half of Bird Cabinet	7	17	0
For Minerals	0	5	0
Book Account	1	2	6
Balance due for "Zoologist"	8	0	0
Carriage of Box	0	2	10
Postage	0	3	4
Mr. Hillier's account	0	14	0
Printing Report for Midsummer	20	0	0
Ditto Notices	0	18	0
Balance in hand	3	8	10
	£45	4	9

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LIST OF DONATIONS.

	£	s.	d.
Mr. Stubbs, Henley-on-Thames	0	10	6
Mrs. Keeling, Bury St. Edmunds	0	5	0
A. Armstrong, Esq.	0	2	6
Image	0	2	6
J. F. Vernon	0	1	0
Harrison	0	0	6
Alford	0	1	0
H. M. Hilton...	0	1	6
A. Babington, Esq.	1	0	0
F. W. Head	0	2	6
T. R. Dumergue	0	10	0

FOR BIRD CABINET.

E. im Thurn	0	2	6
T. E. Maclean	0	1	0
G. A. Lefroy	0	1	0
C. Irwin	0	2	6
C. J. Cole	0	0	6
G. F. Ruck	0	1	0
H. W. Beloe, Esq.	0	2	6
W. R. Carles	0	2	6
E. E. Money	0	2	6
E. Maitland	0	2	6
P. G. Croome	0	1	0
E. H. Carr	0	2	6
F. Chichester	0	1	0
B. J. Oakeley	0	2	6
Machen	0	1	0
W.G. de Jersey	0	1	0
C. St. J. Beauclerk	0	1	0
L. Chapman	0	0	6
P. Leach	0	1	0
P.G.Young	0	1	0
E. Almack	0	1	0
Tweedale	0	1	0
Lloyd	0	1	0
H. Manders...	0	0	6

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	£	s.	d.
E. Estcourt	0	0	6
G. E. Manisty	0	1	0
A. C. Hilton	0	0	6
F. J. H. Jenkinson	0	1	3
G. H. Dawson	0	10	0
Rev. T. A. Preston	0	10	0
H. Mansel	0	0	6
H. a'Court	0	0	6
M. H. Smith	0	1	0

FOR ALBUM.

H. M. Moule, Esq.	0	2	6
Rev. Handley Moule...	0	2	6
W. E. Mullins, Esq.	0	2	6
Rev. J. F. Bright	0	2	6
Rev. T. A. Preston	0	2	6
W. R. Carles	0	2	6

FOR MINERALS.

F. Storr, Esq.	0	5	0

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SALE OF REPORTS.

MIDSUMMER 1865.

No. in hand	3	Sold	4
Copy returned	1		
	4		4

CHRISTMAS 1865.

No. in hand	126	Sold	3
		No. in hand	123
	126		126

MIDSUMMER 1866.

No. in hand	99	Sold	4
		No. in hand	95
	99		99

CHRSTMAS 1866.

Report and Calendars in hand	21	Sold	3
		No. in hand	18
	21		21
Report—No. in hand	94	No. in hand	94
Calendars—No. in hand ...	91	Sold	5
		No. in hand	86
	91		91

MIDSUMMER 1867.

No. Printed	400	Supplied to Members ...	25
		Given away	24
		Sold	278
		No. in hand	73
	400		400

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LIST OF LIBRARY.

No. of Vols.	Name of Book.	Donor.
6.	Intellectual Observer	Rev. J. M. Fuller.
6.	Popular Science Review	"
3.	Recreative Science	"
1.	Flora of Marlborough	Rev. T. A. Preston.
3.	The Entomologist	"
3.	Entomologist's Monthly Magazine	"
3.	The Ibis	"
6.	The Geologist	Rev. T. Cornthwaite.
4.	The Geological Magazine	"
1.	Ootheca Woolleiana (Part 1)	Professor Newton.
1.	Memoir of J. Woolley	"
1.	Cassell's Birds...	A. Herklots.
1.	Synopsis Floræ Helveticæ	Rev. H. Baber.
3.	Flora Germanica	"
1.	British Algæ	Mrs. Gray.
1.	British Ferns	"
7.	Linæus Systema Naturæ	Rev. H. E. Booth.
1.	British Spiders...	H. A. Evans, Esq.
1.	Kirby and Spence's Entomology	W. W. Fowler, Esq.
1.	Dana's Mineralogy	J. B. Gilmore.
2.	Various Papers reprinted from the Quarterly Journal of the Geological Society ...	H. Woodward, Esq. F.G.S., &c.
1.	Montagu's British Birds	Rev. T. A. Preston.
1.	Morris's British Fossils	"
1.	Wood's Index Entomologicus	Purchased
1.	Handbook of Geological Terms (Page)... ...	"
2.	Hewitson's British Birds' Eggs	"
23.	Zoologist...	"
2.	Sowerby's British Wild Flowers	"

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2.	Conversations on Chemistry	H. M. Moule, Esq.
1.	Wells on Dew	„
1.	"That's it" or "Plain Teaching"	F. C. Lightfoot, Esq.
1.	"Homes without Hands"	Purchased.

PRINTER'S ERROR IN ACCOUNTS.

	£	s.	d.		£	s.	d.
Subscriptions.....	5	1	6	not	5	1	0
In Bird Cabinet.....	2	19	9	not	2	16	9
In Expenditure—Printing Notices...	0	18	6	not	0	18	0

MARLBOROUGH:
C. PERKINS, PRINTER, TIMES OFFICE.

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REPORT

OF THE

MARLBOROUGH COLLEGE

Natural History Society,

FOR THE

HALF-YEAR,

ENDING MIDSUMMER, 1868.

"Tum mihi Naturæ libeat perdiscere mores:
Quis Deus hanc mundi temperet arte domum."

MARLBOROUGH:
Printed by C. Perkins, Times Office.
1868.

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PREFACE.

One usually has to qualify the general report of a Society's proceedings by a few dark shades, however bright may be the general effect. And, whether it is necessary or not to do so, one inclines, as a matter of prudence, to look out for the darker shades. In our report for this half-year, however, we have (whether we like it or not) simply and absolutely to chronicle successes. Our field-days, at Ramsbury and Chiseldon, have worked, on the whole, well: our foreign correspondence has been enlarging to a promising and interesting extent. The response to Mr. Preston's kind and well considered offer of prizes was thoroughly good in quality; in quantity it was impossible to anticipate much. Mr. Storr originated, and the Master seconded, the foundation of two prizes for the present year, to be awarded for the largest collection of different sorts of wild plants that should be made within the whole holiday. More than fifty competed; and Macquoid, the winner of the prize, collected no fewer than 104 sorts. Collections generally have been vigorous, and the donations shall speak for themselves; we have to thank Professor Oliver, for a collection of Minerals; the venerable Professor Sedgwick, for a collection of Fossils; Rev. H. Baber, a firm friend of the society, for one of British Plants; H. W. Mercer for one of British Eggs; E. im Thurn, for one of British Nests; G. G. Monck, for one of Coins; J. Pole, for one of British Moths and Butterflies; F. Giles, for several interesting specimens from the Niagara Falls; Mr. Nicholls, of Kingsbridge,

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for twelve Devonshire Birds; Mr. Baker, of Cambridge, for the model of an Auk's Egg; Mrs. Gray, for a bottle of Nutmeg Fruit; Mr. P. G. Wayman, for specimens of Iceland Spar; C. Lawson, for the egg of a White-tailed Eagle; M. H. Smith, for a Hawk and Heron; W. W. Dayman, A. C. Almack, and J. W. Mills, for presents of books; G. H. Dawson, for Bates' *Naturalist on the Amazons*; Miss Corrie, for Darwin's *Plants and Animals under Domestication*; G.F.Miles for specimens of Ancient Pottery; Rev. H. Bell, for the valuable gift of Stainton's *Manual of Moths*. Last not least, we have to thank the President, for a pair of the Greater Spotted Woodpecker: Mr. Gilmore, for the munificent addition of Orkney Fossils to his former gift of Orkney Birds, a gift which calls for special and most grateful mention; H. R. H. Prince Leopold and the Rev. Robinson Duckworth, for very kind presents of two copies of Clark-Kennedy's *Birds of Berks and Bucks*. Let us continue to hope that genuine and vigorous exertion will succeed in maintaining and promoting for our Society the position it has now gained.

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LIST OF MEMBERS.

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TREASURER.

REV. T. A. PRESTON.

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E. ALMACK.

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E. IM THURN.

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P. L. HESKETH.
J. W. HOCKIN.

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RULES.

1.—That this Society be called the Marlborough College Natural History Society.

Constitution.

2.—That the Society consist of Members and Honorary Members.

Officers.

3.—That the Officers of the Society consist of a President, Secretary, Treasurer, and Librarian, to be elected from and by Members of the Society.

Management.

4.—That the affairs of the Society be conducted by a Committee, consisting of the President, Secretary, and three other members of the Society, to be elected from and by Members of the Society; three of whom shall form a Quorum.

President.

5.—That in case of an equality of votes, the President shall have a double or casting vote.

6.—That in the absence of the President, the Committee be empowered to request any member of the Society to take the chair.

Committee.

7.—That on the occurrence of any election, each member of the Committee have double the number of votes of any other Member of the Society.

8.—That two Members be appointed half-yearly by the Society, to assist the Secretary in Editing the Report.

Secretary.

9.—That the duties of the Secretary be to keep a list of all the Members of the Society, and of all former Members and Benefactors who may wish to receive the Reports of the Society; to summon meetings (when necessary) of the Society; to keep a detailed report of the proceedings, as well as lists of Members and Visitors present at each meeting, and generally to act under the direction of the Committee in all matters connected with the welfare of the Society.

10.—That in the absence of the Secretary from any meeting of the Society, minutes of the proceedings be taken by a member of the Committee, appointed by the President.

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Treasurer.

11.—That the duties of the Treasurer be to collect all sums of money due to the Society; to receive all donations of money; and to disburse all sums payable by the Society out of the funds entrusted to him.

12.—That the Treasurer furnish half-yearly a detailed account of the receipts and disbursements to be audited by the Committee.

13.—That the funds of the Society be placed in the College Bank, and that no money be withdrawn by the Treasurer without the signature of the President to the order; or in his absence that of the Secretary.

Librarian.

14.—That the duties of the Librarian be to keep a catalogue of the Library, with the names of the donors; to see that the Library Regulations are carried into effect; to be responsible for the order of the Museum, and when necessary to assist the Secretary in the distribution of the Reports of the Society.

Library.

15.—That any Member of the Society be at liberty to consult any of the books belonging to the Society, but that only certain volumes, to be decided on by the Committee, be allowed to be taken from the room.

16.—That if any member wishes to take a volume from the Museum, he shall give his name, and the name of the book, to the Librarian, who shall enter them in the book kept for the purpose.

17.—That every volume so taken out be returned by the end of the quarter, but that no book be kept more than one month.

18.—That if any volume be damaged, such damage shall be reported by the Librarian to the Committee, who shall decide upon any further proceeding in the matter.

Museum.

19.—That any member of a section, who is not a Member of the Society, be allowed access to the Museum at such times as it is open to Members of the Society generally, provided he first obtain leave from the President, which leave shall be renewed every quarter, but may be taken away at any time, if the privileges be abused in any manner.

20.—That the same privileges be extended, under the same conditions, to such other Members of the School who may wish to use the Library and Collections for the purposes of study, provided there be a reasonable excuse for their not belonging to a section.

21.—That in all cases the Museum be used for the study of Natural History alone, and not as an ordinary Reading Room.

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Members.

22.—That the election of new Members rest entirely with the Committee.

23.—That every Member pay a half-yearly subscription of 2s. 6d., to be paid at the first meeting of the Society in that half-year.

24.—That if a member be elected at, or after the Quarter, he shall only pay 1s. on Election.

25.—That Members have the right to be present, to state their opinions, and to vote at all general meetings of the Society; to introduce a visitor at general meetings of the Society; to have personal access to, and to introduce a visitor to the Museum; and to have a copy of the Report half-yearly.

Visitors.

26.—That on such occasions when the number of those who wish to be present as Visitors at the general meetings of the Society is greater than the number of members who attend, the President and Committee shall be empowered to admit two or more each, as shall seem fit.

Honorary Members.

27.—That Honorary Members have all the privileges of Members, except the power of introducing a member of the School to the meetings of the Society.

Suspension of Members.

28.—That any member be liable to be excluded from the Society by the Committee if, in their opinion, he shall have failed to show sufficient energy in the working of the Society.

Sections.

29.—That sections be formed for the more accurate study of the different branches of Natural History, and that the Heads of these sections be chosen by the Committee half-yearly from Members of the Society.

30.—That these sections shall hold meetings as often as shall seem fit to the Heads of the several sections, at which any member of the School, with the sanction of the Head of that section, may attend.

Meetings.

31.—That ordinary meetings of the Society be held once a fortnight, but that the Secretary be empowered to call extraordinary meetings when necessary.

New Rules.

32.—That any Member of the Society have power to propose any new rule or any alteration in an old one, provided the motion be seconded by another Member.

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MEETING HELD FEBRUARY 21st, 1868.

The following donations were announced, and thanks ordered to be given to the Donors :—

A box of Orkney fossils, by J. B. Gilmore, Esq.

A collection of minerals, by Professor Oliver, F.R.S.

A collection of 12 stuffed birds, by Mr. Nicholls, of Kingsbridge, Devon.

A Sparrow-hawk (*A. Nisus*) by M. H. Smith.

A model of the Egg of the Great Auk (*Alca impennis*) by Mr. Baker, Cambridge.

Egg of the white-tailed Eagle (*Heliœetus albicilla*) by C. E. Lawson.

A pair of the Great Spotted Woodpecker (*Picus major*) shot at Mildenhall, by the President.

Fruit of the Nutmeg (*Myristica moschata*) by Mrs. Gray, of the British Museum.

Specimen of Iceland Spar, by P. G. Wayman, Esq.

Elephant's Tail, by C. Irwin.

Skins of Opossum and Hudson's Bay Rat, by E. C. Sewell.

Two collections of coins, by H. S. Dickinson and W. H. Churchill.

Exhibitions.

Collections of Coins, by E. Almack and M. H. Smith.

Sticks and leaves coated with iron from Northamptonshire, by H. M. Hilton.

A collection of *Echini* from the Chalk in Berkshire, by E. Almack.

A collection of Insects and a Ringed Snake from the Cape of Good Hope, by E. L. Hesketh.

A highly interesting lecture was given by C. M. Bull, Esq., on Celts, illustrated by a large collection of specimens, lent for the purpose by T. E. Maclean.

The President was elected Treasurer, and gave notice of the proposed Field-days.

W. Fergus, Esq., M.D. and E. J. Turner, Esq., were elected Honorary Members, and A. H. B. Reynardson, J. S. Woodhouse, E. C. Sewell, C. A. Sladen and E. L. Hesketh, Ordinary Members.

There were 100 persons present—2 Hon. Members, 20 Members, and 78 Visitors.

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MEETING HELD MARCH 3RD 1868.

This was a special meeting, called to consider means for securing more order at the general meetings of the Society.

It was agreed that members should admit only two visitors each, instead of three, as heretofore; and should take their places in the Museum before the entrance of visitors, for whom they should retain places.

E. Almack was elected Librarian, *vice* E. im Thurn, resigned.

MEETING HELD MARCH 6TH, 1868.

The following donations were announced, and thanks ordered to be given to the Donors:—

A collection of about 1500 British plants, by Rev. H. Baber.

A pair of Quails (*Coturnix vulgaris*), by E. im Thurn.

A Heron (*Ardea Cinerea*) by M. H. Smith.

A Stone Celt, a bronze vessel for the ashes of the heart, a glass lacrymal, and bone implement, by J. W. Parrington.

A head of the Gavial (*Gavialis Gangeticus*), by Mr. Parker, Marlborough.

A Tusk of a young Elephant, by B. W. Repton.

Wattle Gum, Tail of Tasmanian Opossum, and Leg of Astracan Sheep, by E. C. Sewell.

The following works: "British Ferns" by Miss Plues, "British Beetles" by E. C. Rye, "British Moths" by H. T. Stainton, F.R.S., and "British Bees" by W. E. Schuckard, presented by A. C. Almack, W. W. Dayman, and J. W. Mills.

Lists of Botanical and Entomological notices, taken during the past fortnight, were handed round.

EXHIBITIONS.

Ornithology.—Humming-bird, by E. im Thurn.

Archæology.—Samian ware from the Picts' Wall in Cumberland by G. G. Monck.

Bronze Spear and Axe heads and pin, from Ireland, by T. E. Maclean.

Geology.—Series of Scotch Pebbles, by E. Almack.

G. H DAWSON then read the following paper on

THE SALMON.

To MAKE my subject as intelligible as possible and to avoid confusion as far as may be, it will perhaps be better to divide it under at least two separate heads. I shall endeavour therefore to give some account, (1) of the Natural History

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of the Salmon, *i.e.*, to describe the different stages through which the fish passes, with some of its habits, (2) to mention some of the enemies to which it is exposed, and the dangers and difficulties to which it is peculiarly liable.

First, then, I would have you observe that it is one of the very few migratory fish, or, in other words, of those which pass part of their time in fresh and part in salt water without suffering any inconvenience from the change. Numerous species of the genus are found in our Northern seas, but I shall confine my remarks to the common Salmon.

The difference between the male and female fish as they appear in fresh water at the spawning time is considerable, the most noticeable point is an elongation in the lower jaw of the male fish, which turns upwards and forms a sort of hook, of the use of which I shall speak hereafter, it is quite hard to the touch and closely resembles a piece of bone; the male also becomes marked on the cheek with orange coloured stripes, and its whole body is much brighter than that of the female. The latter is dark in colour and in this state is commonly called a black fish. This perhaps is rather anticipating my subject, and I ought first to describe the transit of the fish from salt to fresh water. The cause of this migration, I need hardly say, is the depositing of spawn: this being placed in the more shallow parts of the river the young fish have time to gain strength before they move downwards towards the sea.

The time of year at which the fish leave the salt water for the purpose of spawning varies so greatly in different rivers that it is impossible to mention any definite time at which it takes place, as a general rule. My information on the subject is chiefly derived from what I have myself seen and heard to be the case in a Devonshire stream of no great size, but which is very well stocked with salmon. In different latitudes the season varies very considerably, and in some streams the fish are several months earlier or later than in others.

I must begin by telling you that in most rivers there is a weir, that is, an embankment of large stones, just where the salt water at high tide meets the fresh. This naturally is a great impediment to the fish in making their way upwards, for though the law enacts that some sort of pass be left open for them, it is not generally a very large one, and unless a heavy flood of fresh water comes down the river many of the fish are unable to pass the weir as they might otherwise do. This fact I mention as perhaps it may be the cause of delaying many fish for some time. Just below these weirs there is almost always a salmon fishery, where regular nets are kept for the purpose, and throughout a great part of the year the fishing is allowed, the close months as they are called, when there is no fishing, being from September 1st to February 1st, except that fishing with a rod and line is allowed between September 1st and November 1st. In the river of which I am speaking they begin to take fish in some numbers in these nets about the middle of June, which shows that

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they are then beginning to draw near the fresh water. The numbers increase during the following month, but it is not until November that a great number of fish begin to ascend the river. From that time until March a practised eye will see many of them in the pools and shallows. The floods in the latter part of Autumn no doubt assist them greatly in passing the obstacle in their way.

It is, then, from November till March that the important work of spawning is done. The great object of the fish on first getting into the fresh water is to ascend to the highest possible point, for the sandy shallows are the spots best adapted for laying spawn. They will overcome wonderful impediments with this object in view, and, taking advantage of each flood or rising of the water, make their way upwards with marvellous energy. As the water subsides they are obliged frequently to drop back into the deeper pools, but only to renew the attempt with the first opportunity. The principal obstacles in their way are weirs and mill dams, but they have a wonderful power of jumping, and have been frequently seen to throw themselves a great height from the water, clearing an elevation of 8 or 10 feet and so gaining the water above.

The fish having ascended the river as far as they please or can, begin to make preparations for depositing their spawn. For this purpose they first proceed to dig out a pit in the sand, generally in comparatively shallow water and where the stream is rather swift. It appears that a male and female fish work together, and the excavation which they make is quite large enough to be very plainly seen from the river bank if pointed out by a person who has been accustomed to watch the habits of salmon, otherwise it might easily escape the notice of a chance passer by. The manner in which they first make the furrow is by working up the gravel with their noses, rather against the stream for they cannot work with their heads down stream, as the water, going into their gills the wrong way, would in a manner drown them. I have noticed the fish when engaged about one of these pits repeatedly turning over on their sides, and showing the white under parts I cannot say whether they may then be actually shedding their spawn or whether this operation may assist in throwing up the gravel. It is doubtless in a great measure done by the noses of the fish, and in this kind of work the under jaw of the male fish, which I mentioned above, must be of service. The pit being made, the fish proceeds to shed its spawn into it, to complete which operation takes from 8 to 10 days, at the end of which time it covers the spawn with the gravel previously thrown up. After this the fish betake themselves to the pools to recruit their strength. The adult fish having spawned, and being out of condition and unfit for food, are called unclean fish; the male when in fresh water, among other names is sometimes called a *kipper*.

With the floods of the end of winter and commencement of spring they descend the river from pool to pool, and ultimately reach the sea, where they

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quickly regain their condition to ascend again in autumn for the same purpose as before; but always remaining for a time in the brackish water, before making either decided change, obtaining, it is said, a release from certain parasitic animals, either external or internal, by each change, those of the salt water being destroyed by contact with the fresh, and vice versa. It is moreover probable that the constitution of the fish, is such as to require a gradual change: that the salmon is considerably affected by passing from the salt water to the fresh is evident from the change of colour which accompanies the difference of the state of the element.

Having said so much and, I hope, given you some idea of the habits of the adult fish, I will try to tell you something of the young fry, the result of the spawn deposited in the manner described above. How long it takes for the ova to become young fish I cannot exactly say, but the young fish remains for a considerable time, for many days, either clinging to or covered by the sands of the spawning bed. On its first exclusion from the egg it has a very singular appearance. The head, as in the case of the tadpole, is large in proportion to the body, which is exceedingly small, about five eights of an inch in length and of a pale blue colour. The most singular part of the fish is a conical bag-like appendage which adheres to the abdomen: this bag is about two eighths of an inch in length, of a beautiful transparent red, much resembling a light red currant—in consequence of its colour it may be seen at the bottom of the water when the fish can hardly be observed. This bag appears to contain a supply of nourishment for the fish when in its earliest stages. At the end of about 50 days it contracts and disappears, and the fish then becomes perfectly developed.

At this stage it is commonly called the Parr. There have been great disputes as to whether this is really the young of the salmon or an entirely different species of fish, but from experiments which have been made it seems to be certain that it is the Salmon Fry. The chief reason for doubting this is the colour of the fish, which is of a blueish tint, without the silver of the salmon, whilst the fish is particularly characterised by transverse bars, something like finger marks on each of its sides. The young salmon, as might be supposed, would be of a silvery colour, but this it seems is not the case until it reaches the age of one and a half or two years.

Through the latter part of the spring and the summer the Devonshire rivers abound in a wonderful degree with these Parr, which take a fly at times with such readiness or even greediness that they are a perfect nuisance when fishing for trout. In most rivers you are ordered to return them to the water, otherwise at times, especially on bright and hot days, a fishing basket of moderate size might be filled with them, and though very small they are remarkably sweet and good to eat. They vary a little in size, but generally

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are about from 4 to 6 inches long, and hardly any one of them weighs more than two ounces. These, it seems, are the fish in their first and second years; near the conclusion of the second year the fish assumes with great rapidity the characteristics of the salmon, the transverse bars disappear, and silvery scales take their place.

It is a very common error to suppose that salmon fry attain a length of six inches in as many weeks and after the lapse of this brief period take their departure to the sea. It is the rapidity with which the two-year old Parr assumes the aspect of the salmon fry which has led to this mistaken conclusion; for hasty observers, noticing (1) the hatching of the ova in the early part of the year, (2) the seaward migration of young salmon at a season of the year very shortly afterwards, have imagined these two facts to take place in immediate or speedy succession, whereas in reality the young fish which are migrating sea-wards have been two years or nearly that time in fresh water.

Many experiments by careful observers seem to establish these as certain facts. In one case several specimens of the Parr were caught in the month of July and placed in a pond supplied by a stream of fresh water; where they continued to thrive remarkably well. In the month of April following they began to assume a different aspect from that which they exhibited when first placed in the pond, and catching some of them in May they were found to have assumed the usual appearance of what are generally called salmon smolts or fry, being of a fine deep blue on the back with a delicate silvery appearance on the sides of the body. A circumstance occurred in May worthy of notice as illustrating the migratory instinct of these fish: they seemed at that time to be decreasing in numbers, and on examination it was found that some of them had leapt altogether out of the pond and were lying dead at a short distance from the edge. From this it is evident that the fish at about this period in their existence, *i.e.*, in their second year, perhaps nearly at its conclusion, would in the natural order of things be making for the sea.

I should perhaps here say a word of the *salmon peel* as it is called, which is a fish varying from ¼lb. to 3 lb. They come into the rivers about the end of July when they may be caught with the artificial fly or minnow. It is a disputed point whether they are the young salmon in a certain stage of growth, or fish of a different species but of the same genus. In this authorities differ, and I cannot say what may be the truth. One person whom I myself consulted on the subject and who has observed the habits of salmon a good deal is inclined to the latter view of the case, that is, that they are not of the same species as the common salmon.

This is, I fear, but an imperfect account of the salmon and its habits, but having said so much I will now pass on to the second part of my subject,

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and say something of the difficulties and dangers to which the fish is exposed You will always observe that any creature which is unusually productive has a great number of enemies to contend against, and the salmon is no exception to this rule; though in its case the destruction is greater than it need be, and a little care and good management might greatly lessen it. Whilst speaking of the great productiveness of the fish it may be well to mention that a yard square of suitable gravel is sufficient to hatch 20,000 salmon ova.

If therefore all the fish, which try to ascend our rivers, were allowed to do so and to reach the spawning beds, which may generally be estimated by acres, the number of fish produced in a single year would be something prodigious, and if these numbers increased to a large extent, an abundant supply of nutritious food might be procured by all classes and at a moderate price—it is very plain that salmon *need* not be such an expensive luxury as it is at present. Taking this into consideration it seems worth while to consider briefly what are the chief causes of the present destruction of the fish—of these there are two which may especially be noticed—*first*, the fish are not allowed to ascend the rivers as far as they would naturally do, and so are obliged to deposit their spawn on unfavourable ground—*second*, too many fish are killed, that is, there are not enough left to stock the rivers.

As regards the first difficulty, I have already mentioned the obstacles which are caused by the weirs of which there are so many in most rivers, but it may be well to speak of these rather more at length. We will suppose, then, the fish to have reached the first weir in the river, just where the fresh water meets the salt, and for argument's sake we will suppose that he does so in one of the months when salmon fishing is allowed, for many fish are unquestionably trying to get into the rivers before the late autumn or beginning of winter when fishing is forbidden by the law. There is probably but little fresh water coming down and the obstacle at first appears impassable: at last after trying it at many points the fish comes to the entrance of the salmon pass, a narrow passage, that is, or a sort of trough of water passing through the stones of the weir. Here there is sufficient space for a fish to pass upwards, but it does not look inviting, and it is a great chance if he ventures upon it, for many hours at least; and before he makes the attempt the net of the fisherman who lives close to the weir encircles him and his companions who have gathered towards the one spot with the same object in view. By these means a very large majority of the fish are taken in the season. There is indeed a certain time in each week when the nets cannot be used, from 12 o'clock noon on Saturday, to 6 a.m. the next Monday morning, but it is improbable that many fish make their way through the pass in this short interval. Supposing any should do so, it is only to meet with a similar obstacle a little higher up, for at the next weir there is probably a net similar to the one below, or perhaps no

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fish pass at all; and so on all the way up. It is therefore almost a miracle if any fish do manage to reach the shallows in a river, which are the regular spawning grounds, at this season of the year: and this fact probably accounts for the great scarcity of salmon in many of our rivers during the summer months, whilst they are found there in considerable numbers in the winter.

Now let us consider the case of a fish which has to make his migration in the autumn or winter, and we shall see he is not much better off. There *may* be a flood of fresh water, and he may therefore find less difficulty in surmounting the weir. Otherwise there is the same difficulty about the fish pass, and this is said to effectually prevent some fish from getting into the rivers at all. There are no nets now to stop him for they are forbidden by the law, but there are poachers who care nothing for the law or for the fact that 9 out of 10 of the fish are not fit for eating. I am now speaking particularly of what I have myself seen, and I believe that on the river in question, there are many men who during the winter months almost make a livelihood by salmon poaching. At that season the fish are very abundant, and are easily taken, the men like the sport and are able to make something by selling the fish to farmers, who, as a class, encourage this sort of thing. Two keepers only are kept to look after some 12 miles of water, and so good a watch is kept upon them that they are easily eluded. Moreover supposing a man is caught in the act of taking a fish, the penalty, which is not large for the first offence, probably does not fall upon him personally, for he is in all probability a member of some poaching club; so that the individual has not much of the fine to pay. All this shows how easy it may be for persons to destroy fish in an illegal manner, and you may form some idea of the numbers which are killed when I tell you that I have heard of a man having boasted of having taken out, as they call it, 100 fish in one winter. The price which a farmer will give is from 4d. to 8d. a pound according to the condition of the fish, and in some instances even the farmers' sons try their hands at the business. The general way of taking the fish is by the use of the spear or gaff, and if the fish is anywhere within reach it is not very difficult to kill him as he will not take much notice of pokes, &c., and will remain in the same place for a long time together. The spear which is used is a murderous sort of weapon, having four points with two barbs. It is more generally used than the gaff, though the use of the latter is, I believe the more artistic way of taking fish. Such is the chief danger to which the fish is exposed in the winter months; but there are others, as for instance mill wheels, which destroy numbers of salmon. As they are returning down the river they are very liable to run into a mill leat, and are thus washed under the wheel when their destruction is inevitable. In January, 1867, I saw a large male fish picked up close to the bank of the

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river, which weighed 22lb. without its head, and had evidently been killed in this way as there were many bruises across his back. Millers will tell you that they pick up many thus killed. Again I have seen a fish partially eaten by an otter, and some few no doubt are killed in this way.

The poachers and these other enemies and difficulties explain in part what I meant by saying that there are not enough fish left to stock the rivers. But besides this, the legal fishing is carried on in a manner which is, to say the least for it, highly injudicious. As I have said, almost all the fish in the summer months are caught before they have a chance of entering the river at all, and thus perhaps the strongest and healthiest of all are prevented from breeding. The owner of the lower fishery says "If I don't have them my neighbour above will and I have as much right to them as he has," and the same thing is repeated by the owner next above and so on. Thus the real danger to the fish is caused by its migratory habits; they are not like fixed property and every body takes his share when he can get it. The mistake of the present system of fishery is that the landowners and others who have the right of fishing have no mutual reliance, no community of action in preserving the stock. If it were otherwise all would benefit by it, and the number of fish might be greatly increased. A writer in Fraser's Magazine who has written an article on "Prospects of the Salmon Fisheries" makes some remark of this kind and as a remedy suggests that all the Landowners and others claiming the right of fishing on the rivers should form an association and establish fisheries at certain points only on the stream; so that too many fish might not be destroyed, and the fishing might thus be conducted in a judicious and systematic manner. Each landowner might thus have his share of the proceeds according to a value set upon the water on which he has the right of fishing, and the wholesale destruction of fish at the lower parts of the river might be stopped. Questions of this kind are now being constantly debated, and you can hardly open "The Field" and some other papers without finding some article on Salmon and Salmon Fisheries. It is to be hoped therefore that something will be done for the better preservation of the fish in every way, in which case their increase would manifestly be very rapid. Without saying anything against the present Act on the preservation of Salmon, we may at least hope to see its enactments better carried out.

S. B. Dixon, Junr., Esq., and F. Storr, Esq., were elected Honorary Members; and S. Image and H S. Sankey Ordinary Members. E. B. Maitland resigned.

There were 114 persons present 3 Honorary Members, 27 Members, and 84 visitors.

W. H. Macdonald, Esq., was elected an Honorary Member.

There were 125 persons present, 6 hon. members, 27 members, and 92 visitors.

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MEETING HELD MARCH 20TH, 1868.

THE following donations were announced, and thanks ordered to be given to the Donors :—

Stainton's "Manual of British Moths," 2 vols, by the Rev. H. Bell.

Darwin's "Animals and Plants under Domestication," 2 vols., by Miss Corrie.

Bates' "Naturalist on the Amazons," by G. H. Dawson.

A collection of Coins, by A. D. Nind.

The Heads of Sections gave their Reports.

EXHIBITIONS.

Geology.—Part of the Shin-bone of an Ox, from the drift in Berkshire, by E. Almack.

Entomology.—Caterpillar's Nest from a Fir-tree, near Leuk, in Switzerland, by the President.

Archæology.—Cockle Shells worn by pilgrims to the Holy Land, by the President. Portion of a Shell fired into Pompeii by the French, in 1849, by E. Almack.

Botany.—Rice Plant and Sugar Cane from Egypt, by E. S. Preston.
Specimens showing the peculiar growth of *Wistaria Sinensis*, by H. M. Hilton.

Zoology.—Specimen of Venus' Flower Basket *(Euplectella speciosa)*, by E. im Thurn.

The Rev. J. SOWERBY then read the following Paper, illustrated by Maps and Photographs, on his

WALKING TOUR IN SWITZERLAND, IN 1864.

IF in the present paper reference is frequently made to things generally uninteresting, such as times and distances, and in particular the state of the weather, I must plead in excuse that on a pedestrian tour in Switzerland these things are of the utmost importance, and take precedence of everything else. The last question you ask before going to bed is "what kind of weather do you think it will be:" the first on waking "what kind of weather is it?"

I entered Switzerland by way of Bale and Lucerne, and on June 25th I took the mid-day boat to Fluelen. No amount of repetition can spoil the charm of that voyage. The only nuisance is the numerous touters, either landlords or agents of landlords, who pester you to take carriages to different points on the St. Gothard road. One man was most importunate and even rude, in answer to my frequent refusals, but when to satisfy him I explained that I was going to Unterschächen, he became quite civil. We had some conversation together, in which he regretted much that the country was not

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flatter, a wish in which I need hardly say I did not agree, and finally he was kind enough to volunteer to send my old guide Ambrose Zgräggen from Silenen to join me. At Fluelen I got into marching order. The road to Altdorf was very dusty and the sun oppressively hot; so as soon as I turned down a shady lane leading westwards into the Schächen Thal, I took off my coat and waistcoat and strapped them on to my knapsack. After passing Bürglen, Tell's birthplace, a village picturesquely situated among trees, the road began to ascend, and in a few minutes I could see into the Schächen Thal, whose scenery here is nothing particular. The sight of some butterflies reminded me of my recently developed entomological tastes, in proof of which I had a net and a collecting box, which were soon made ready, and a stick cut from the nearest copse. Very soon I came on a perfect cloud of large blues, something like Chalkhill, whilst on the other side of the road were a number of Black-veined Whites hovering above some running water. After capturing some dozen, I went forward again, the weather now becoming overcast and some rain beginning to fall. Presently over the wall on one side I saw several other butterflies. They were only Marbled Whites, but in my ignorance I thought they were Bath whites, and was over the wall in a moment after what I thought a great prize. The first stroke I missed him, but thrust my alpenstock right through my waterproof. With more care and deliberation I succeeded in securing three of them. I passed Spiringen where a path turns off to the Kinzig Kulm, by which Suwarrow's army passed in 1799, and in another hour reached Unterschächen, a long straggling village, extending some ¾ of a mile. From an eminence at the entrance of the village I had the first fine view of the head of the valley backed by the Clariden Alps. I went right through the village without discovering the Inn, and was then disgusted to learn it was at the other end. No wonder I missed it. I don't think the sign was six inches square and it was more like a weathercock nailed on the wrong way, than anything else. The house looked by no means inviting, but they had just built a new one over the way and had furnished some of the rooms without as yet occupying it. These at any rate had the advantage of perfect cleanliness. I was rather afraid that I should be starved, and was relieved to find they had some veal, and capital bread, butter, and beer: and on these I thought I could hold out very well till Monday, when I had no doubt of being able to make a pass I proposed into the Maderaner Thal and get to better quarters at Amsteg. Next morning I was suprised with the grand view from my window. The Brunni Thal which enters this valley here from the south, is closed at its head, by a magnificent circle of mountains, whose precipices are in some cases nearly 1¼ miles high. After breakfast I walked to the Klausen pass, about three hours off, but had no view as the weather was hazy and gloomy. Returning about three in the afternoon I was glad to find Zgräggen. He was not acquainted with the pass I wished

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to make but offered to take me by another more to the west. We made arrangements for starting next morning, but without much hope of doing so, for the long threatened rain had at last begun to come down steadily. All night it never ceased and next morning was falling as continuously. The clouds had descended and lay almost on the ground, so that nothing was visible but for a very few yards either way. The intervals between the welcome oases of meal-times were very hard to fill up. I read Murray (for I had been assured in London that his was the best guide, being a new edition) and the more I read him the more I maligned him, for I was continually falling in with something I knew to be wrong. I observed all I could see out of the window, sketched the parson's house opposite and himself as he passed from parsonage to church in his robes, and examined everything in the rooms till I knew them all by heart. The salle-a-manger was adorned with three engravings, one of Odessa, a second of Cronstadt, no doubt memorials of the Russian war. The third was a thoroughly German picture, called the tree of love; in whose branches are represented twelve gentlemen of different ages and occupations, whom as many young ladies by various devices are endeavouring to capture. One has just applied a ladder and succeeded in leading off a gallant hussar, others have ropes and hooks; and two are endeavouring to saw the tree down and capture the whole at once. Beneath are some verses relating the story of this tree; the whole being a creation of Gretchen's sleeping fancy, who sighs on awaking to find that it was all a dream. My position was truly isolated: except at meals I was the only inhabitant: the only means by which I could summon the waiter, or landlord rather, was by a series of shouts or by going for him. Zgräggen now and then paid me a visit of condolence on the state of the weather, but with these exceptions I saw nobody. The weather improved a little at night, and I went to bed at eight hoping to be roused at four with the news of a fine morning. But in the morning the fog and rain were both very bad, so I took it out in sleep and did not get up till eight. At about five however my curiosity was roused by a noise, repeated sometimes at longer, sometimes at shorter intervals, which exactly resembled the sound of a bat against a ball. I hardly thought the Schächenthalers would play cricket, or if they did, not at so early an hour, and at last I was curious enough to get up and see what it was, and took some shame to myself when I found it was the sound of the swinging wicket as the people passed through to early mass. As the morning advanced the clouds began gradually to rise, and it was soon evident that a great quantity of snow had fallen in the upper regions; the pines a few hundred feet up the slope were all hanging white. At noon it was so much better that we ventured on a walk up the Brunni Thal to the base of the great precipice. The fog still hung low and snow-showers fell occasionally, but the breaks in the clouds shewed patches of blue sky. The

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rumble of dust avalanches was heard almost incessantly, we saw many of them descending the rocky face just like waterfalls. These seldom fall except during the winter or immediately after a fresh fall when the snow is dry and powdery and has undergone no pressure. The surface snow only slides off, which is unable to rest on the slope, and is disturbed by the wind or some other cause. We returned to the hotel with better hope for the morrow. Had I not had this to sustain me I think I must have been driven to translate Gretchen's dream or to compose an ode on the weatherbound stranger, and in either case I am sure English poetry has suffered a loss.

Next morning the weather was all we could wish. Just before starting Zgråggen informed me that the curé had been summoned to visit a sick person on the Sittliser Alp. This lay on a high plateau some 2000 feet above the village, reached by a path through the Brunnithal, and inhabited in the summer by a considerable part of the population. Rather a serious undertaking, to climb for some two hours through deep snow to visit a parishioner, and a rare summons too, for generally the younger members of the family go up to live on the Alp, and the fine air tends to keep them in health. The injuries to which they are liable are rather those of accident than of disease: the falling rock, the avalanche, the false step that betrays them over the cliff or into the roaring torrent number more victims here than the fevers we so much dread. You cannot walk far without seeing some token of such a fate: a cross, a rude image or painting of the Virgin marks the spot. Here they are nameless, but in the Tyrol an account of the accident is added and often a rude representation of it, not always without merit. Last summer in descending the Oetzthal we counted not less than 70 of these memorials. We got away at 5-40. We followed our walk of yesterday up the Brunnithal, and then struck off to the right up through a pine forest. We soon came to the fresh snow and made all the preparations we could against it, for it was both soft and sloppy. We soon got out of the pine wood into a valley running parallel to the Schachenthal, by name Griesthal. The snow became gradually deeper till it was often over our knees, and after we left the shelter of the wood, the glare of the sun upon the snow was almost insupportable. I had both veil and spectacles; but Zgråggen not anticipating a snow pass had come unprovided, so I lent him the veil and put on the spectacles myself. The ground was rough, covered apparently with stones and patches of alpine rose bushes, whose tops here and there were sticking up above the level sweeps of snow. Zgråggen never knew whether he was going in a foot or a yard, and met with many a mishap in spite of sounding. Of course I profited by his stumbles, but with all my care I could not escape some falls, though the depth of snow saved me from any damage. About 9-30 we reached an empty chalet, rather wearied with our long wading and were glad to use it for our first refreshment

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as the snow made it impossible to sit down outside. Here we had an opportunity of looking round at more leisure. In front the valley in which we were still continued rising slowly, its beds and sides both covered with snow. Behind we saw in line one after another the Great Windgelle, the Great Ruchi, and Scheerhorn, a magnificent array of rocky peaks. Between the second and third of these lay the pass I wished at first to make; the long snow hollow leading up to it was right opposite to us. Close to us was a singular little peak, very steep and rocky, called Schwarz-stückli, which the late fall of snow had converted into a little Matterhorn. We started again before 10, and after going about half a mile up the valley began to climb the ridge on our left. As this was steeper, our progress was slow and it was eleven before we reached its crest. The wind had swept the snow clear from some parts of this, and we were enabled to sit down comfortably, though the thermometer was only 38°. An observation with an aneroid gave the height about 7,400 feet. The view from so low a point was very singular, it resembled more what you see on a pass of 10 or 11,000 feet; nothing but snow and rock was visible, except that in the distance we could see some pinewood on the slopes leading to the Kingy Kulm. Below us on the other side was a small lake, the Seweli See, surrounded by some patches of flat land, which ought now to have been occupied by the grazing cattle These had all been driven to lower regions at the approach of the storm. Descending the steep slope we passed the lake just at its outlet, and began to pass at a level along a slope of grass between two ranges of precipices. This slope had evidently been covered with snow which had slid off again, for the grass was all straightened out downwards, as if it had been hard raked. Presently we came to a patch of snow, about an acre in extent, which had evidently fallen from above, as it was not smooth, but quite lumpy, and covered with irregular masses, sometimes several feet higher than the rest. A part of this on the lower side furthest from us had apparently just slid off. I did not like the look of it at all, and proposed to go close up under the upper rocks. Zgräggen, however, objected to this on the score of possible avalanches from above, so we started to cross it at the narrowest part which might be 30 or 40 yards wide. The walking was troublesome, for it was very uneven and sometimes you could hardly get your legs over the lumps. We had nearly got over, when a shout from the guide attracted my attention, and I saw that the portion beyond, under which we must pass, was slowly moving downwards with a hissing noise. Somehow or other we were off the snow in a moment and running for our lives under the moving mass, which we then beheld rush over the cliff below with a thundering roar. It would have seemed safer to cross the patch higher up, where it was broader, as there would have been more resistance to any tendency to move. Had we done so, I really think we should have been too much entangled in it to escape.

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We were soon clear of the slope and well round the shoulder of the Little Windgelle, whose pinnacles stood out finely above us. A rapid descent down some steep and slippery grass slopes brought us to a path, which though rough made the walking easier. We got down into the valley at 3.30, having descended nearly 6000 feet; another quarter of an hour brought us to Amsteg, where the White Cross received me more like a friend's house than an Inn. Here I found a letter for me from Mr. Preston, giving some information which I hoped would enable me to know some of the butterflies I might catch. I meant to take my ease the next day and to start by a glacier pass for Engelberg on the Friday. Next morning I went over the Reuss to a flat piece of ground covered with low shrubs, which is overflowed when the river is in flood. Here I caught some Apollos (magnificent butterflies they are, with their orange and crimson rings) and some more imaginary Bath whites: but the sun would not stay out, so in the afternoon I took a short walk up the Maderaner Thal, ascending by Frenschberg and returning by Bristen. In the evening, rain again set in, and continued till the middle of the day, when it cleared, and I went with Zgräggen again up the valley. After passing Bristen we turned to the left and climbed up to the village of Golzern (nearly 3000 feet above Amsteg) and its pretty lake, encircled by pines and famous for its excellent trout: passing this we descended again into the head of the Maderaner Thal by a steep and in some places difficult path, which crossed the faces of several precipices with very indifferent hold for feet or hands. And yet habit renders even these easy to the natives; I saw both men and women traversing this and some with heavy loads. On an eminence commanding a fine view down the valley, and which probably is one of the very few situations quite safe from avalanches, we found the workmen busily employed in preparing the foundation of a new Hotel, contemplated by the enterprising landlord of the White Cross, Major Indergand. He was here in person and invited us to have some coffee. I asked some questions about Gideon Trösch, an old guide of this neighbourhood, of whom I read a strange story in Tschudi's "Animal Life in the Alps," that once in his youth he had had a terrible struggle with a vulture. He had shot the creature and thrown it over his shoulders to bear home. Recovering, it attacked him with great fury, until he was at last able to fell it and (as he thought) kill it by a blow of his gun. But strange to tell, the very same thing occurred again. The vulture again recovered, and again attacked him, and it was only by desperate efforts he at last came off victorious. They said he was still alive and boasted of this exploit, and further, that though now old and unable to climb much, he thought no one knew half so much about the hills as himself. On the way down we saw the curé of Bristen at his fishpond. It is well stocked with Golzern trout and fenced off by a strong wall from the foaming Kerstelen Bach, whose rush makes the bridge quiver. We did not get

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to Amsteg till 7, and after giving the necessary orders I went off to bed, as I was to be called at 1 and to have a vehicle as far as Klus, a village opposite the entrance into the Erstfeld Thal.

I awoke next morning with the consciousness that I had been called, and lighting a candle found that it was twenty minutes past one: so dressed hastily and on going down found breakfast ready. We got away soon after two, and in half an hour were at Klus. Here some time was lost in looking for a rope, and we did not get fairly under way till 3.15. It was a dull morning with just twilight enough, for us to avoid obstacles. A steep ascent of 20 minutes brought us into the entrance of the Erstfeld Thal, and the walking then became easier. The valley runs nearly due West and its bed for a long way rises gradually; on one side or the other were occasionally spots capable of cultivation. In about two hours we reached a gorge, through which the stream rushes in a series of fine cascades. The path here was close to the water and we sometimes had to go over rows of pine logs fixed into the face of the rocks and slippery with the spray. At the head of this we halted for another breakfast by the side of a small rivulet. Twenty minutes soon passed and we left the gorge to find ourselves at the commencement of another level part. The day began to look better; the clouds began to clear off, and some fine rocky points were visible on both sides. In front rose the Schlossberg, a range of dark precipices surmounted by a snow peak, glittering in the sunshine. After passing some dirty chalets we came to a fine waterfall some 300 feet high, rushing over the cliffs on our left: supplied by two small tarns called the Ober and Unter Fulen See. The foot of the glacier was reached at 7.30 and as far as I could judge we had risen about 4000 feet from Erstfeld. We were in the centre of a vast amphitheatre of glaciers descending from the Kröntlet, Spannorter and Schlossberg. The first of these lay to our left, surmounting the most shattered portion of the icy circle: the second right in front, rising still more than 5000 feet above us. Between this and the Schlossberg on our right was a deep depression, over which we were to pass. From our point of view it seemed possible to ascend directly up the glacier, but Zgräggen said the recent snow fall had covered over everything and made the dangers invisible. He proposed to gain the slopes of névé under the cliffs of the Schlossberg and to follow their line to the summit. Between us and these slopes lay a lower line of cliffs, and we gradually advanced to the base of these, always crossing avalanche snow. I had never seen so great a quantity. Many acres were covered with it, dirty, sodden, and lumpy, and tossed up like the waves of the sea.

Crossing the rocks with some difficulty we halted for a few minutes on a piece of moraine, to put on rope and spectacles before entering on the névé; we here could see much of our Wednesday's walk: the snow had entirely dis-

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appeared from it. In a few minutes after starting we found that we were going to have a harder task than we had bargained for. We ought to have been on the snow three hours before; already it was so soft that we sank over the ancles at every step. As we advanced, it soon became plain that enormous quantities of snow had come over the cliffs during the last day or two. Every ten minutes we had to cross the debris of avalanches, which had come from the Schlossberg, many of which extended hundreds of yards to our left far down into the amphitheatre, widening as they descended. These, though rougher to cross, afforded firmer footing than the smooth intervals between them, which every minute grew softer. A few light clouds occasionally passed slowly over the glacier about our level, and afforded a welcome shelter from the heat. We had just crossed the remains of an avalanche and were on the névé beyond, when a faint hardly perceptible murmur was heard from above. In these regions of solitude the slightest sound attracts attention. Again it came more distinct from the cliff overhead. Avalanche, said Zgraggen, and as I hurriedly looked round to see where we had better go, he pointed out to me that we were on *smooth* snow, and that the avalanche would only descend by its wonted channel. Whilst these few words were exchanged the murmur became a deep rumble, the rumble a rattling roar and with wonder, not unmixed with terror, I saw the mass of snow burst like a huge waterfall from the top of the cliff and fall with deep dull thuds upon the slope within little more than 50 yards of us. Almost at the same moment another flew over the cliffs just behind us. There were not merely masses falling over, but long streams forming a continuous fall for nearly a minute. It was a magnificent spectacle; but some of those whose remains we had crossed must have continued falling for many minutes, possibly for hours, when the Schlossberg began to shake off the mantle of snow which summer had unexpectedly given him.

When silence once more reigned we went forward, ever slower and slower. The windings of the cliff for some time hid the top of the pass from our sight, and on turning a corner we seemed to be not more than half a mile off; but I thought that half-mile was never coming to an end. After going in knee-deep it became very wearisome, and at last we were reduced to halt every 50 yards or so, and by patiently repeating this operation, we at last gained the col at twelve o'clock, exactly eight hours and three-quarters after leaving Erstfeld. Here the oppressive heat was immediately exchanged for a sharp cutting wind. The aneroid observation gave the height 8720 feet, so that we had ascended more than 7000 feet from Erstfeld. The view was of course very limited as the cliffs on each side came within 100 yards of each other. The finest part was the expanse of glacier below, on the border of which we had come up; it was too cold to rest here so we soon started on the descent. The snow was

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too soft either for glissading or sliding, but by sitting on our alpenstocks laid lengthways we got up a respectable pace and in 15 minutes got off the névé on some rocks, where we stayed basking in the sun for more than half an hour. I was so wearied with the long pull through the snow that I could hardly eat anything; and the acid Neuchatel seemed nauseous. What would I not have given for a glass of beer! Our downward course then led us rather N. still under the cliffs of the Schlossberg. We presently come to a long hollow filled with snow, which seemed to promise good going, and all was very comfortable till we found that stones from the top of the cliff fell into it—I saw several come from the top with a bound just as if they had been running down hill. We very quickly got to a respectable distance on the further side, and only approached when we were forced to cross it in order to get further round the Schlossberg to turn a line of cliffs below. We had in fact almost to make a complete circuit of this ill-disposed mountain, which on both sides seemed to resent our proximity. We reached the valley about 2.30 and soon joined the horse track from the Surenen Eck. About 20 minutes after reaching this, when we were on the N. side of the stream and several hundred feet above it, we heard a crash overhead, and looking up, saw a cloud of dust above the opposite cliff, some 2000 feet up, and perceived that a large mass of rock had broken away from the face and fallen into a rocky ravine below. Here it was out of sight but we could hear it grinding furiously through and see the puffs of smoke shooting out from the force of the collisions. Presently the rock or rather its fragments, (for it had now broken into three pieces) emerged from the gorge: and these at almost every bound parted into more, so that in less time than I take to read it, the opposite slope was covered with blocks of all sizes running and jumping furiously down, with a confused sound of rumbling and crashing as they jostled one another. The cattle fled in all directions and Zgräggen declared that he saw one of them struck. I thought our position one of perfect security, but some of the blocks bounded across the stream and came far up on our side. When the confusion was over, the lowings of the terrified cattle were heard, whilst still up above a cloud of dust hung over the cliff like a funeral pall. No doubt we owed this unusual spectacle as well as the sight of the avalanches to the late heavy fall of snow and its rapid thaw. Such falls are like the avalanches, most common in the spring. When on a large scale, they are far more destructive than these to property and life, as all they cover is hopelessly ruined: and instances are on record where hundreds and even thousands of lives have been sacrificed.

After passing Herren Ruti, the farm of the Abbey of Engelberg, the valley began to open out, having more than a mile in width of level land, and 5 or 6 miles in length; here were large fields regularly laid out and cultivated. Almost all the valley belongs to the abbey, whose monks carry on a large trade

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in cheese and cattle. We reached Engelberg about four and put up at the hotel Catani. As soon as possible, I had some soup and a glass of beer, which refreshed me greatly and I felt all right again. Next morning I went up to a pleasant spot in the woods above the village and sat there long, enjoying the lovely scenery. The wide fertile valley with the back-ground of dark mountains, surmounted by snow peaks, made me think this a most desirable place to spend a week. Excursions of all kinds, light or heavy at pleasure, combined with the prospect of fair, if not good, accommodation at the end would be a great attraction. We intended to cross a pass called the Grassen on Monday; but I feared the soft snow of which we had such a dose yesterday, and hesitated what to do. In front of me above the opposite woods rose the Pfaffenwand (or Priest's Wall) with its sharp zigzags leading up to the Joch Pass to Meyringen. The sight of it recalled to my mind an old promise of three years standing, to go and climb the Ritzlihorn with the curé of Im Hof with whose family we had become acquainted in 1861. So I joined the early table-d'hote, where not less than 90 or 100 sat down, and had a very good though rather greasy dinner: the beer however was first-rate. After this we packed up our traps and got away at 2·30. As we neared the Pfaffenwand, rain began to fall, though not heavily—at the top of it we met with a French school, travelling as is their wont with a tutor, and with the smallest amount of impedimenta I ever saw. One porter always seems enough to carry the baggage of the 12 or 15 who compose the party. Just after passing them the storm began to come down in earnest,with thunder and heavy showers of hail. The kindness of the Amsteg people had provided us with umbrellas, which were a great protection against the driving hail. The storm lasted all the way to the top of the Pass, which we reached at 5·30. After halting a few minutes at Engstlen to refresh we hurried down to Im Hof, where we arrived at 9: exactly six hours and a-half from Engelberg. Next morning I called on the curé and found only his wife and mother-in-law at home. He was at a business meeting held in the hotel. I tried to persuade them all to come and dine with me, but only could get himself to come. He had not yet made the ascent and was quite willing to go, but after consulting several of his parishioners, he said there was still too much snow. This as it turned out was a great mistake, there being hardly a single snow-bed on the west side; but concluding that they must know best, I promised to come again in a fortnight and have a try with him. Not to lose time, we started after dinner and walked up to Stein at the foot of the Susten Pass, where we passed the night at a little inn more than 6,000 feet above the sea. Next morning over the Pass to Wasen and up the St. Gothard road to Andermatt; this was one of the finest days we had, and I regretted much we had not tried the Sustenhorn, but the guides asked rather a high price. At 4 on Wednesday we left

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Andermatt and followed the road to the Oberalp Pass for about an hour, then turning to the left we gained a col between the Rienger Stock and the Bergli Stock, about 8,000 feet high, leading into the Felli Thal, not having had more than an hour on snow. This valley we traversed in its whole length. It was rather monotonous on account of its straightness, though we had some fine views of the Bristenstock and Mutsch on the right. We stopped some time at a chalet, where Zgräggen found acquaintances. I waited outside and was amused by observing the sagacity of the pigs of the country; there were three of them lying in a little hollow in a bank into which the sun shone with full strength, the inside one looking and no doubt feeling excessively comfortable; another appears on the scene and after surveying the situation with the eye of a general, steps in and lays himself down on the back of the inside one, keeping well next the bank. The oppressed pig struggled, but the more he moved the deeper the new comer sank in, until at last the other got up and went away with some indignant grunts which probably meant that he would come back presently and serve him the same. A steep descent through pinewoods brought us to the valley of the Reuss. On this descent I caught a moth, very like a Greenveined white, &c., and a Fritillary something like a Duke of Burgundy, with a very purple underside to the hindwing, perhaps Melitaea Dia. Once into the valley it was excessively hot and butterflies were very plentiful. The slopes in some of the hayfields were covered with Apollos. I got a number of them and also some fine specimens of the common Swallow-tail. The scarce one I never saw except in the most southern parts of Switzerland. I find surprise expressed in my note-book at having as yet caught no Great Fritillary; of course it was hardly time for them. We reached Amsteg at 1 p.m., after a charming walk, the more pleasant that no one had anything to carry, having sent our traps to Amsteg by the diligence.

Next day I hoped to have a fine hunt, but as usual in those cases, the sun never came out at all. I walked up the old road which follows the east side of the valley as far as the bridge (Felli brucke) where the Fellithal joins the main valley; and on the way I caught a couple of butterflies very like large Walls. This part of the road must have been fearfully exposed to avalanches. It crosses two hollows in the face of the Bristenstock, one cut deeper into the mountain than the other. The former was close to Amsteg and I have seen snow in it 12 feet thick lying close to the bed of the Reuss as late as the month of July. This year the second ravine was choked with the remains of avalanches. The stream had bored its way through, and from the lower end you could see through the tunnel, which was 60 or 80 yards long and high enough to admit of going through upright, though I did not care to venture. Close by was a cross marked 1861. In the spring of that year a father and two sons who lived near, were crossing on their way to some work. The sound

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of the coming avalanche was heard and all hurried across to gain a place of shelter, but only the father reached it. So firm and deep was the mass of snow that the bodies were only recovered three months after from their icy tomb.

On the 8th of July we started at 5.30 for a walk among the hills west of Amsteg. Having no definite object, we went very slow and stopped frequently. Here I perpetrated the only piece of bird's-nesting I recollect. Seeing a bird fly out from under a rock, I felt and found a nest containing three eggs, one of which I took from curiosity and brought home with me. It was very like the shore lark's egg, of a deep mottled grey colour. In about 4½ hours we were on the ridge overlooking Amsteg. Behind us was a rocky double pointed summit, which would evidently command a better view. So we felt our way towards it, becoming gradually conscious that to go to it along the ridge was the worst possible way. The rocks were several times very troublesome. Sometimes we must go over, sometimes creep under them—now finding advance impossible and retreat almost as difficult. A boy who was looking after some cattle assisted us a little and once nearly led us into a place between two rocks from which I am certain I could not have got without help. We had no rope, or a great deal of trouble would have been saved. Got up at last about 12.30. We were about 8,000 feet high, and had a fine, though limited view, except towards the N. and N.E. I made a list of the principal objects visible, amongst which were the lakes of Lucerne, Zug and Zurich. We left the summit by a different and much easier route, and got down to Amsteg in 3½ hours. At one time I had the net out, and a man observing my occupation told me he had something very wonderful, which he ran off to fetch. It was a large moth very badly set, for which he asked three francs. I declined to purchase, but took a hasty sketch of it, from which I afterwards found it was a Death's-head.

July 9th, I went with with Zgräggen and Joseph Maria Trösch over the Kreugli Pass to Sedrun, to ascend the Oberalpstock. We were 8 hours in getting over but we sauntered very much. On the way we paid a visit to Trösch's summer house in the Etzlithal, where he lives with his wife and two children in a comfortable but very dirty state. He has some rights of grazing up there, and about 25 goats, which constitute him a man of some mark in his own neighbourhood. From the top of the pass (7717 ft.) we had a full view of the Oberalpstock, and discussed the mode of attack, which was obviously much easier than the way followed by Hoffman in 1847: but I think the great quantity of snow this year was very helpful to us.

We left Sedrun next morning at 4 o'clock. There was a thick fog, with a heavy dew, which made us hope the weather would be all right. For more than an hour our way lay up the Strim Thal which we descended yesterday. To my surprise we met a whole family coming down. They had left the Etali

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Thal the previous evening and crossed the pass at midnight to attend the festival of St. Blasius at Dissentis, which we had the pleasure of witnessing two years ago, and which is chiefly remarkable for a great expenditure of powder and a long procession of relics. They made some communication to my guides, which was quite unintelligible to me, till enlightened by subsequent events, about some one being in a great rage. As we approached the head of the valley the fog began to clear off, and we beheld with joy the glorious snow peaks glittering through the misty veil. At the foot of the Kreuzli Pass we struck off to the right up some grass slopes and from there gained a branch of the Strim glacier over some rocks. Here we halted for a second breakfast. A bottle of wine was opened, and Trösch began, as I thought unnecessarily, to uncork a second bottle, but found that they had been studying my tastes and had brought a bottle of beer for my special use. The face of the mountain above us, with the exception of the precipices just below the summit was one vast sheet of snow and ice. In ordinary seasons there are large patches of rock, but these were all covered with snow. We had to gain the ridge to the right of the peak and then turn left along the ridge. The snow was in first-rate order just letting the foot bite well, about an inch in. We gained the ridge in three long zigzags about 9, and the top (10,925) in half an hour more, the last ascent being very sharp. The magnificence of the view was indescribable. Not a cloud was to be seen; more than three fourths of Switzerland lay before us; Mont Blanc, Monte Rosa, and the whole plain of Switzerland from Neuchatel to Constance, bounded by the blue Jura. We tried in vain to find the bottle left by Herr Hoffman 17 years before. Trösch had placed it with his own hands, but it was now too deeply covered. It was first found three weeks later by another party. We enclosed our names and some remarks in a bottle, and after nearly two hours enjoyment (the thermometer was 53°) we started for the descent. The snow had grown much softer, too much for glissading, but we had some magnificent slides sitting, and by this means got down from the ridge to our breakfast place in 20 minutes. Continuing down a snow bed by the side of the rocks we gained the grass slopes, and immediately spread ourselves out on our faces to dry, the only discomfort being, as I remarked to the great amusement of the guides, that the bed was too steep. We got back to Sedrun at 2 p.m., and found the angry man had arrived in the person of Herr Meyer Bischoff, president of the Bale section of the Swiss Alpine Club. He had I believe engaged my two guides to go up this very mountain with him, and was now quite put out because they had gone up with some one else. He had come into the Etzli Thal last night in search of Trösch, and learning from his wife that he was gone with an Englishman to ascend the Oberalpstock, he hurried over the Kreuzli very early to try and meet us; but when he gained the pass,

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he saw us already high on the opposite slopes. I paid Trösch 25 francs which did not seem much considering it was three days work for him. We left him at Sedrun, to make the ascent with Meyer Bischoff next day, and went down to Dissentis. It began to rain before we left, but the landlord kindly lent us an umbrella as we were going to his brother's Inn. We had some capital trout for supper, fresh from the Vorder Rhein. Next morning between 4 and 5 we started for the Brunni Pass which leads due North into the Maderaner Thal. For an hour and a half we followed the stream up a narrow valley, which then opened out into a wide undulating Alp. An hour over this brought us to the foot of a snow ravine, running up between the mountains Piz Ault and Crap Alv, and terminated by some rocks. The snow was rather steep and hard, but the rocks, once reached, were easily crossed in 10 minutes, and we found ourselves on a level with the upper névé of the Brunni Glacier. A hollow between the snow and rock afforded us a comfortable resting place. I made the height 8900 feet which was not far wrong. The Oberalpstock on our left was enveloped in clouds, but as it was about 9.30 we concluded the other party must be near the top; and Zgräggen commenced a series of jodels which were presently answered from the top or somewhere near it. We crossed the glacier, where we ought to have had a rope, and got off the ice in 1½ hours and down to Waldibalm in about 2 hours more. They had fitted up here a small chalet with three beds. Madame Indergand was here in person and did all she could to make me comfortable. We walked out in the evening towards the Hüfi glacier. The hill on which the hotel is building commands very fine views of the Dussi stock and Scheerhorn on the East looking up the valley, and on the West of the Bristentock and the mountains beyond the valley of the Reuss. On our way back we passed a small tarn in which we saw the snow views reflected in the most lovely way. I had hoped to see Trösch arrive before night, as I knew they meant to try and descend directly into the Maderaner Thal; but as he did not appear, Zgräggen engaged a young fellow, Melchior Trösch to assist us in the ascent of the Great Ruchi. As the night was warm and we feared soft snow, we started at 2 a.m., by the light of a pine torch. This on the whole gave a very good light, but it was very treacherous, and every now and then all but went out, when you were in some critical position, as on a rock in a brawling stream with the opposite bank invisible. In half an hour we were enabled to dispense with it. We followed a path up the first range of precipices to the Alp above, and then kept along the terrace between the two lines of cliff. This narrowed more and more, until some care was required: one part of it is called the bad step. In about 3 hours we reached the snow slopes leading to the Aelpli Firn, and an hour up these brought us to the upper névé, where the object of our attack made his appearance, as a small, narrow, and steep

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snow ridge, surmounting several hummocks of *névé* which broke away right and left in blue ice cliffs. We first crossed the glacier nearly due North and then went West towards the peak. After surmounting the hummocks, which were each of considerable height, the final ridge was before us. It was so steep that the surface was coming off in small avalanches with a sizzling noise and I began to think it would be a failure. We left everything but the rope, and approached the ridge just above the last hummock where the surface had slid away most and formed a kind of furrow. I was last and being heaviest went in deep; but we got on slowly and steadily up to a rock just below the edge of the ridge. This from below looked nothing, but it took at least a dozen steps to get round it, and we were on the ridge exactly at 8.30 This ran north and south for about 15 yards, just wide enough to walk on, and a little raised at the north end where it widened out a little to a space about 4 feet in diameter where we could just stand together. To our right was the slope up which we had ascended: to our left a dark precipice: in front as we looked down the first object that met the eye was the chalets in the Brunni Thal 6000 feet below: we almost seemed suspended in the air above them. A series of jodels followed to celebrate our success (it was supposed to be a first ascent) and these were answered first by the barking of a dog from some Alp below and then by a human voice. The sky was cloudless and the view very fine but our space was too limited to enjoy it—I felt as if I could hardly turn round. At 9.15 we left the top. Trösch went down first; I followed, Zgräggen paying out the rope to hold me up in case I should slip. This operation was repeated until we were near enough to slide down on to the hummock, where we sat down and clinked glasses to our own healths and that of the Gross Ruchi. We caught a tortoiseshell here nearly 10,000 feet above the sea. After descending the monticules we went S. right down the glacier and returned by the way we came into the valley. It was excessively hot. I never traversed any glacier where the heat was more intolerable. At our journey's end, my guides mixed wine and milk and coffee with an impunity which I envied. The chalet did not furnish many luxuries, so I had some tea and then lay down awhile. I was aroused at 4 by the news that if we meant to start we must make haste as a storm was coming. Two umbrellas were provided for Madame and myself and were very useful, as the hail came down as big as cherries. It was surprising to see how quickly the streams began to swell; the inclination of the ravines down which they descend is so great. Ten minutes later we should probably have been unable to cross some of them.

Next morning I parted from Zgräggen who had been with me 16 days. I paid him, trinkgeld (20 francs) and all, 175 francs—£7, which I thought not unreasonable considering the number of expeditions we had. I had been fortunate in the weather every day we climbed; and now I was favoured with

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a magnificent day for butterflies and caught them in great numbers; four kinds of Fritillaries, amongst them a Queen of Spain, Red and White Admiral, Great Tortoiseshell, some very fine Erebias, nearly black, Burnets both 5 and 6 spot, and several others of unknown species. Paphia I admired especially; I had no idea that I should find it abundant in the Forest when I got back to Marlborough.

Next afternoon I left Amsteg with regret, and went down to Beckenried, whence I made my way over the Brunig to Hof to make the promised expedition with the curé. Unfortunately I had no view on the Brunig, but it was a very pretty walk, and the quantity of wood much enhanced the near views. Murray deceived me by informing me that I should find the hotel du Brunig on the top, whereas it is at Lungern several miles off. I found the curé would be unable to start before the 20th as there was to be on that day a funeral of a man, a servant at the Grimsel, who had fallen into the Aar while crossing a new bridge, whose flooring was not complete. It happened in the early morning and escape must have been hopeless. Nothing but the most immediate help could rescue aught from death when once engulphed in that wild river. The efforts of the strongest swimmer would but prolong his sufferings. The weather was of the most melancholy character, rain and fog without a gleam of sunshine. At 12 on Wednesday, from the window of the hotel I saw the funeral train approaching. There must have been at least 200 people, chiefly men: only a few women, probably near relations, followed the coffin. The words of the landlady, 'he was his mother's support,' and the loud lamentations of the poor woman herself, sorely disturbed my equanimity. Our preparations were all made and we got away at one, after dividing the baggage between us. I carried an extra shirt and pair of socks, a piece of meat perhaps two pounds, a dozen hard-boiled eggs, two small loaves, and a bottle of wine. I think he carried more, at least he certainly seemed to have a heavier load. We took no guide with us, he said he had had too much of them and seldom spoke of them but as brigands and rascals. After crossing the valley which is here nearly a mile in width, we had a short but rather steep ascent into the Arbach Thal. I was surprised to find this open out into a wide level several miles in length and more than half a mile wide, bounded on the north by the cliffs of the Engelhörner, a magnificent wall of precipice. Of evil name are these cliffs and the peaks that surmount them. More than one bold chamois hunter has perished amongst their wild recesses. The eldest of the Laueners, the boldest hunter of that stalwart race, was one of the latest victims. For some time we had a delicious walk through meadows and cornfields. The day improved, the sun shone out, and my hopes both of butterfly and mountain success rose high. I caught a Queen of Spain and some fine

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Swallow-tails; but the level at last came to an end, and the path rose steeply to the left to surmount a gorge through which the river passes. Three quarters of an hour overcame this, and we were on the Schrättern Alp, where we crossed the stream to a long grass slope surmounted by cliffs. The unstable nature of this slope was well shewn by the fact that several streams down the face of the cliff did not flow over, but right under it. We again rose rapidly to surmount the cliffs between which the stream passes; then leaving the cattle track, which climbs still higher, we crossed the faces of some rocks by a somewhat hazardous path, with good holds however for hands and feet in the nasty places. Suddenly coming to the stream, we found ourselves right in front of the Gauli glacier, the final wall of ice being within a few yards of us. The view over the upper snow slopes up to the peaks that divide it from the Unter Aar Glacier was very fine. Close to us were the chalets of the Matten Alp about 6,400 feet above the sea, which maintains about a dozen cows and a few pigs and sheep. The huts are built back into the slope so that you can walk on to the roof from behind. An inner apartment in one of them was allotted for a resting place, the outer one being tenanted by two calves and a sheep, who seemed disposed to resent our intrusion. After effecting what change we could in our dress, we went to another chalet where the day's milk was already over the fire. Refreshed with some bread and warm milk I sat by the crackling blaze and watched the operation of separating the curds from the whey. The first skimming of the milk, brousse, or zieger, as it is called, is very delicious, like a fine trifle, and I almost eat too much of it. There were two boys in the hut about 14 and 10 years old. They were much interested in the butterflies and the aneroid barometer which I in vain endeavoured to explain to them was not a watch. The curé soon dropped asleep, which I was not sorry to see, as he had complained of fatigue on his way up, and seemed feverish and exhausted. When all the curds had been scooped out of the caldron, the whey was poured off and all the inhabitants of the chalet, visitors excepted, washed their hands and faces in it. The herdsman then went out with the pail, and gave a long whistle. This was to summon the pigs, who came at full gallop and as many as could thrust their snouts in. The man saw justice done and kicked out the stronger when he thought they had had enough. This man was to be our guide for the next day; he said it would be 6 hours up, and as many down as it was so rocky. Further that he could not start before 6 as he had his cows to milk. This dismayed me, as it seemed to threaten us with another night at the alp, so the curé said he would try and find some one else in the morning. We got settled very comfortably in our chamber. They gave us a good heavy coverlet, which was most useful, as the cold was very sharp. The night was splendid, we could see the stars glistening brilliantly through the

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holes in the unmortared wall. The murmur of the glacier stream was our only lullaby. I soon fell asleep and slept for nearly 5 hours and was quite undisturbed by the enemies I dreaded. We got up about 5 and the curé went off to seek another guide, and presently returned with Andreas Neiger, who had been before with him on the Hangendhorn, the mountain that stands out so finely as you look from Hof up the Urbach Thal. I went down to wash in the glacier stream close to its exit from the ice, and precious cold it was. We got off only at 5.45 accompanied by the two boys. The lower part of the mountain is a series of slopes alternating with lines of cliff. The upper part for at least 2,000 feet was a series of countless rocky pinnacles. Turning right and left as required to avoid the cliffs, we got amongst the rocky points in about three hours. Here began a miscellaneous scramble, with no particular difficulty, occasionally only requiring the use of hands as well as feet. We bore to the left, towards the lowest point in the ridge. Here all our provisions were left and the two boys forbidden to go further. The rest of us followed the ridge southwards to the summit. This was rather more difficult as it was narrow and rugged and we could not always follow the top. The highest point (10744) was gained in 10 minutes—making 5¼ hours from Matten, only we wasted some time at a crystal hole, where I broke the spike of my alpenstock. The East face of the mountain goes down with frightful steepness into the Harli Thal. Looking at it, I could not conceive how we could have ascended on that side as proposed in 1861. The only way would have been to gain the ridge at a point a good deal N. or S. of the top and then to follow the crest. The view again was singularly good. The whole valley from Brienz to the Grimsel was spread before us like a map. We sat for some time enjoying it in the utmost comfort, as the temperature was 52°. Both white and brown butterflies were hovering about. Returning to our fellow-travellers, we all got the most comfortable seats we could and prepared for dinner. From this point we could see Hof and the parsonage nearly 9,000 feet below. The curé told us it was his wife's birthday, and we all drank her health at a higher elevation than her friends usually did it. He however was not satisfied with this but kept continually waving his glass in the direction of the house and exclaiming 'Happy wishes! Happy wishes!' he also amazed me by beginning to talk English, not getting however beyond 'How do you do?' and 'What o'clock is it?' Altogether we had a very pleasant meal. We left soon after 12. On the way down little Hansli, the smaller boy, caught the smallest (?) fritillary I ever saw, with a very purple hindwing; he was a most active little boy, and ran admirably down the rocks, selecting with unerring instinct the spot were he must bring himself up. On the slopes above the chalets are found some fine patches of Edelweiss, which everybody prizes. Got down to

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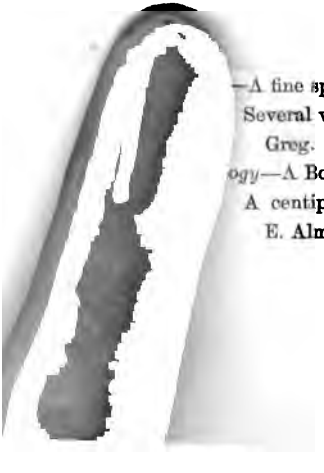
Matten at 3 p.m., in less than 3 hours instead of 6, and after a long rest and some coffee, paid our bill (only 12 francs for guide, board, and lodging), started for Hof at 5 and got down there at 9, after a most pleasant day. I was much pleased with the hearty and kindly way in which all the parishioners welcomed the curé.—They all seemed to be on such affectionate terms with



—A fine specimen of Iron Pyrites, by E. Almack.

Several varieties of Quartz, and a specimen of Specular Iron, by W. Greg.

ogy—A Box of Insects, captured this year, by H. M. Hilton.

A centipede, which had exhibited Phosphorescence when alive, by E. Almack.

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A collection of Chinese Butterflies, by H. Manders.

A Diamond Beetle, by E. C. Sewell.

A "Wood Barata," a large and venomous Insect from Rio de Janeiro, by the President.

Archæology—Some Roman Pottery from Westmoreland by G. G. Monck.

A curiously shaped Clay Pipe, found in Savernake Forest by — Giles.

A British funeral urn by E. Almack. A collection of Coins, by H. M. Hilton.

Botany—Preserved Figs from Georgia, by E. S. Preston. Excrescence of Wood from Savernake Forest by H. M. Hilton.

There were also exhibited a Chinese Visiting Card by J. B. Fuller; a Seamouse, by B. J. Guillemard; a portrait of an Aborigine from Rio de Janeiro, by E. C. Sewell; and a Caucasian Dagger by T. Kensington Esq.

A paper was then read by E. Almack on Avalanches.

There were 73 persons present—4 Hon. Members, 23 members, and 46 Visitors.

MEETING HELD APRIL 17TH, 1868.

THE following donations were announced and thanks ordered to be given to the Donors.

A very valuable and extensive collection of British Fossils, by Professor Sedgewick, F.R.S.

Specimens of ancient pottery, from Bingham, in Nottinghamshire, by P. F. Miles.

THE Heads of Sections gave their reports:

EXHIBITIONS.

Entomology.—A Mole cricket, by the President.

Geology.—Specimen of "Plum-pudding" stone, by E. Almack.

Archæology.—A collection of coins, by — Thurnam.

Model of an Irish cross from Kelso, Co. Meath, by H. M. Moule, Esq.

Ornithology.—A pair of Water Ouzels, by E. im Thurn.

Botany.—Specimens of Rye straw and plait, from the Orkneys, by the President.

Zoology.—Specimens of coral, from the Pacific, by H. A'Court.

A Tiger's skull, by the President.

H. M. Moule, Esq., then read the following Paper on

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NATURAL HISTORY IN THE FOURTEENTH CENTURY.

DEEPLY interested as many of you have learnt to be in the details of natural knowledge—in the processes of observing, collecting, and classifying—it becomes in my mind the more desirable for that very reason that you should sometimes take more general and more extended views of what you are about. I believe that every student of Natural History, for instance, would be at once an abler inquirer and a better educated man, if he were to embrace any opportunity that occurred of becoming informed about the history and the literature of that branch of knowledge. To learn how many ages ago the first germs of what we call modern inventions or discoveries were lying hid in the human brain, and were even produced in literature; to learn how often mankind has, as it were, just touched the port or harbour of some great discovery, and how then by the merest accident speculation has been driven far out to sea again; to notice how comparatively powerless the most gigantic intellects have been in bygone days for want of instruments or processes which to us are matters of familiar use: this, it seems to me, is to imbibe the very essence of the educating influence that flows from Natural History. This is an influence which imparts an even balance to the mind: and enables us to make a just estimate of our own powers and our own times. By the side of Aristotle, many naturalists who have rightly enjoyed considerable reputation in modern times, are but pigmies But their *knowledge* as compared with Aristotle's knowledge is as a fully developed figure to an as yet unformed fœtus. In this I read, not the littleness of Aristotle, but the greatness of God, and of his agents, Time and gradual Developement from causes to results.

It is with thoughts such as these that I invite your attention for a few minutes to some remarks on Natural History as it existed five centuries ago. That is to say, in the time of Chaucer and Gower, and Langland and Wiclif: the time of Edward III and Richard II; the age of thought and progress that, with the single exception of the 16th Century, forms perhaps the most remarkable epoch of any in our national annals.

I wish to show you that, notwithstanding the greatness of that epoch, natural studies were then still in an infantine stage of progress. I wish to show you that partly as they were derived from ancient sources, and partly as the product of the times themselves, the researches and the beliefs of that age teem with absurdities and puerilities. And I will show you that this was the case, not from any want of power in the men but because the researches were based on no principle at all, or on erroneous principles.

I propose by way of text, to read you a few lines from Chaucer's Prologue to the *Canterbury Tales*. These lines describe the "Doctor of Phisik," and

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incidentally give us some extremely interesting information about the books, and methods, and objects of natural knowledge in that age: —

Ther was also a Doctour of Phisik,
In al this world ne was ther non im lik=
To speke of phisik and of surgerye:
For he was grounded in astronomye.
He kepte his pacient wondurly wel
In houres by his magik naturel
Wel cowde he fortune the ascendent
Of his ymages for his pacient.
He knew the cause of every maladye
Were it of cold, or hete, or moyst, or drye,
And where thei engendrid, and of what humour;
He was a verry perfight practisoner.
The cause i-knowe and of his harm the roote.
Anon he yaf the syke man his boote.
Ful redy haddo he his apotecaries,
To send him dragges, and his letuaries;
* * * * * *
Wel knew he the olde Esculapius,
And Deiscorides, and ceke Rufus:
Old Ypocras, Haly, and Galien:
Serapion, Razis, and Avycen:
Averrois, Damescen, and Constantyn:
Bernard, and Gatisden, and Gilbertyn.

To paraphrase some of the more difficult of these lines, they would run thus:—

"He had a good knowledge of the heavenly bodies. He was thus able to portion out wonderfully well to his patients, by this scientific knowledge of nature, the most favourable hours for taking medicine, or for undergoing operations. He could also construct magical images for the benefit of his patients, selecting with skill, when they were making, that conjunction of the heavenly bodies which would be most favourable to the patient's case. He was an adept in the four elemental conditions of the atmosphere, cold, hot, moist, dry; and in the four humours, blood, phlegm, choler, melancholy. As to his library, he was well acquainted with both the Greek and Arabic physicians and natural philosophers."

Now I beg your attention to the last sentence that "as to his library, he was well acquainted with both the Greek and Arabic physicians and natural philosophers." There are few chapters in the history of the human mind, as it has been truly said by Dean Milman, more interesting than the propagation of Greek learning in Europe by the Arabs, and the influence of that learning upon themselves. Between the 8th and the 12th centuries there came sweeping over Europe and settling in it tide after tide of remarkable Orientals. Settling first in Spain and spreading their influence by and by from thence to France and Italy, they form a link between the worlds

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of ancient and modern thought, and in particular they handed down the lamp of natural learning from the age of Aristotle, from Hippocrates and Galen, to the age of Bacon, and Cuvier, and Linnæus, and Harvey, and Ray, and Sydenham.

The "Doctor of Phisik," you will remember, had in his library the works of Avicenna and Averrhoes. These are the only Arab names of the list that I need trouble you to remember, but these should be remembered.

Avicenna in the 11th century and Averrhoes in the 12th, spread abroad the knowledge of Aristotle in all parts of civilized Europe. Their influence and intellectual position may be inferred from the fact that they are placed by Dante among those who needed only baptism (they were Mahometans) to be saved. How extremely well suited they and their school were to be the exponents of Aristotle, who wrote so widely both on mental and physical knowledge, will be gathered when I say that every Arab philosopher was a physician, and almost every physician a philosopher.

Now these men, as I say, and several generations of similar men of whom these were the greatest, read, translated, explained and introduced to the west the works of Aristotle, and in particular his physical works, his natural science treatises. Hippocrates and Galen were also much in request among them; but Aristotle, who was the contemporary of Hippocrates (though many years younger) and the inspirer with him of Galen, supplied the Arabs with their chief material, and was in their eyes incomparably the greatest figure in the ancient world.

Let me just insert here a few facts of year and date about these men. Aristotle died in 322. Hippocrates had died 35 years before at a very great age (104); so that he had actually been in full practice in Attica during the Peloponesian war. Galen, a native of Pergamus, in Mysia, was a contemporary of the Roman Antoninus, and died A.D. 200.

You now have, if you followed me with any distinctness, a sort of chain or series of great names, from Avicenna, Averrhoes, and Razis (in the 12th, 11th, and 10th centuries) back to Galen in the 2nd century and Aristotle and Hippocrates in the 4th before Christ. And as the European natural science of the 4th century was still almost entirely coloured by the Arabian philosophers, and as they in their turn were the faithful exponents of Aristotle, it will give you a fair and clear idea of 14th century principles if I take Aristotle, and (chiefly by the aid of Mr. Lewes's treatise on his Natural History Works) explain to you what his position towards science really was.

You will then understand what a gulf lies between ourselves and even our predecessors of only five centuries ago. You will be aware not only that there is a shorter interval between the 14th age A.D. and the 5th B.C., than be-

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tween the 14th and the 19th A.D., but that while the science of the 14th age was to all intents the same as that of the 4th B.C., that of the 19th century in which we now live has become possessed of principles and methods simple, wonderfully simple, in themselves, but which may lead us into wider and wider fields of truth by an onward progress of which it is impossible to foresee the end.

Aristotle then, the father and founder of Natural History as it was known to Chaucer and his contemporaries, was the greatest Greek of the 4th century B.C. He was born 384, and died 422. A native of Stagira in Northern Greece, he spent the greater part of his life at Athens, when intellectual life at Athens was at its highest. He was a pupil of Plato's, and, what perhaps had quite as much influence on his after career, he was for four years private tutor to the young Alexander. I say that this exerted great influence on his later career, because in addition to the splendid money payment which he received as his fee, (perhaps £200,000), he received from Alexander the power of making his magnificent and enormous collections in natural history. We are told by Pliny, that Alexander gave orders to his hunters, gamekeepers, fishermen, and birdcatchers to furnish the philosopher with all the material which he might desire,—an order which at once placed several thousand men at his disposal. And remember that this was no stationary force; but that this grand squadron of collectors moved with Alexander from the western regions of sunny and teeming Asia Minor, across the valley of the Euphrates, through the steppes to the east of the Caspian, and on to the very confines of the Himalaya region. Large exaggerations were probably made, and must certainly be allowed for in this and every other statement about Aristotle's collections, but it is unquestioned that in a greater or less degree, the resources which I have mentioned were at the disposal of Aristotle for several years.

Add to this, in your conception of Aristotle, that he possessed a force of intellect which made him the leading mind in European thought nearly two thousand years after his death: and which was capable of sweeping, not one science or one branch of thought only, but the *omne scibile*, the whole cycle of human knowledge. His influence, it has been truly said, has never been exceeded except by the great founders of religions. Yet the sum total of his vast labours, when weighed and tested by the positive evidence of modern science, appears insignificant when not absolutely erroneous; and the humblest investigator in our or any other association is now able to take a point of view which Aristotle was unable to take, as well as instinctively and unhesitatingly to reject mistakes which would have led Aristotle astray. And when I say Aristotle, remember that I include the many generations of active thinkers and workers in Natural History who followed him, and whose methods were in active operation so late as the 14th century.

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Now let us proceed to take some examples of this extraordinary feebleness in so great a man, and then to ask the reason of it, and of the superiority which now lies within our own reach.

To begin with, Aristotle had never dissected the human form. Even Galen, a professed doctor, who lived five hundred years later, had probably never done so. But Aristotle had never used a scalpel. He had certainly no idea at all of the facts of our blood system. He did not know the difference between a vein and an artery. He did not know that we have such things as muscles, and he was a complete stranger to that grand wonder of the human frame—the nerve system, which springing from the prime nerve centre (the brain) is spread in countless ramifications into all parts of the body.

Aristotle knew nothing whatever of the true process of digestion; but he had a theory, observe that, and this was his theory: He held that the stomach was a kind of natural stove, and that in it the food was *cooked* by the animal heat. In the distribution of the nourishment which we receive, he taught that nature acts like an economist, that as freemen eat the prime portions at meals, slaves the inferior parts, and dogs the offal of an animal, so the nobler organs of the body (flesh, the senses) receive the sweeter parts of food, and the baser organs (bones, hair) the more bitter.

Here are a few instances of his erroneous beliefs in very simple matters. In man, in sheep, goats, and swine, he remarks that the male has more teeth than the female. In this perfectly erroneous position he was perhaps confirmed by a few exceptional cases of malformation. Again he has the hardihood to tell us that the heart lies *above* the lungs, in which case perhaps I need hardly tell you that we should, always in fact, instead of sometimes in a figure, have our hearts in our mouths, or at any rate a very large lump in our throats. And he states that the heart of the ox is peculiar, for that there is one kind of ox which has a bone in the heart, and in the heart of the horse there is also a bone.

He was weakest of all perhaps in what he says of the brain. The actual facts about the brain are these. This wonderful and perfect organ completely fills the cavity of the skull from front to back, the lesser portion of the brain substance (known as the cerebellum) lying in the back part of the skull; and further, more blood goes to the circulation of the brain, than to that of almost any other organ of the body. The healthy circulation of blood through the brain is in fact one of the very first of all important conditions on which bodily vigour and efficiency depend.

But by Aristotle it was believed that there is no blood at all in the brain, a clear proof that he could never have seen one, as the red spots denoting vesicles containing blood, and the numbers of minute vessels that traverse the

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surface of its substance, are plainly to be seen the moment the organ is laid bare. It was further his expressed belief that the back of the skull is quite empty.

One more instance and I have done with specimens of a list with which a laborious student of Aristotle's natural works might fill a volume. He informs us that "if a woman suffering from scarlet fever, look at herself in a mirror, the surface of the mirror is suffused with a kind of bloody mist and that the mist, if the mirror be quite new, cannot be rubbed off without difficulty." This was probably one of the old wives' tales of his day, and Aristotle had never taken the trouble to ascertain its truth.

And this leads me to the main point of these remarks on Aristotle, I mean the *reason* of all this queer and strange error in a man so versatile, so active, so great.

The reason in two words was this, that with all his greatness he did not really know what it is to ascertain truth. He loved truth intensely. He has a maxim that it is our duty to sacrifice even our own flesh and blood when the cause of truth is at stake; but he did not know the nature and value of two things which to you are most familiar terms—*correct observation* and *complete verification*.

These are two terms, indeed, but they represent one and the same thing; observation is verification begun, and verification is observation completed.

Now Aristotle went without verification for two reasons. First, he did not feel the want of it. This was universally the case in ancient times. It was the case in the fourteenth century. It was the case until the long cycle of mistaken methods ran out, and the true principle of slow, patient observation was developed chiefly by Bacon, and after him by many other great names, in the 17th century. The philosophers who went before, from Aristotle downwards, were like mariners without a compass. It is Bacon's own remark that men had to coast along shore till they discovered the mariner's compass. He might have added that, on the ocean of truth, the ancients too often daringly struck out without feeling the want of a compass, and almost invariably went wrong. That compass is *verification*.

Aristotle did not feel the want of this compass, and that is the first reason why he went without it. The *second* reason is, that he had no useful workmen who could construct it. In other and plainer words, he had none of our modern instruments without which observation and verification in the right and only useful degree are impossible.

Take meteorology. He did indeed hit upon the fact that heat is the chief agent in meteorologic changes. But this was a guess. He could carry it no further; he could not test his guess by observation, for he had no thermometer

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to measure the heat of the atmosphere, no barometer to measure its weight at different times and places, no aerometer to measure the velocity of atmospheric current, no hygrometer to measure the quantities of vapour, and lastly he had no instrument by means of which to *establish* and *test* the presence of electricity, of which he knew nothing, but which plays as we know an important part in meteorologic phenomena.

And thus it was through failing to perceive the paramount need of verification, and being destitute of the means whereby to attain it, that this man of gigantic genius and industry has broken down, if we look merely to the scientific results of his labours. Thus it is, that though politicians, and metaphysicians are and always will be among his eulogists, you will find no modern astronomer, no physiologist, no chemist.

And now to come back more directly to the 14th century, can you wonder that the Aristotelian method of natural science, defective as we have found it to be, even in the hands of its amazingly powerful originator, when it came to be transmuted first through the hands of Mahometan believers like Rhazis, then of Mahometan sceptics like Averrhoes, then of Christian mystics or thinkers like Albert the Great and Thomas Aquinas and Roger Bacon, and then of Christian ignoramuses or schemers whose names are legion, should have furnished forth to the later middle ages all that vast tissue of curious research and assumption and half-sense and utter nonsense, which we sum up in the two names Alchemy and Astrology.

The shaky and feeble anatomy and physiology of which we have had some examples, the keen pursuit of the *elixir vitæ* or essential principle of life, and of the philosopher's stone, which was to change all baser metals into gold; lastly, the half awestruck, half sharp-practice-like exploration of the heavens, with a view to divine their influence on the destinies of persons or of communities and to obtain the means of acting on or with that influence, the "magic naturel" of the worthy doctor in Chaucer; this fairly sums up to you what Natural History was in the 14th century—an age which you will remember was one of our foremost periods of national greatness—an age as I just now observed, full of military and statesmanlike activity and strength, full of energy and progress in the world of thought.

Before quitting the subject, let me briefly put before you a few simple thoughts illustrating the impossibility (not absurdity) of astrologic science. The position of the heavens at the time of birth settled every man's character of body and mind, the various fortunes he would meet with and his position towards friend or foe. Anyone, therefore, born at or very near the same time as Alexander the Great in the same country might have had a right to expect a somewhat similar career. Twin brothers would never fail to have the same

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horoscope; their careers must therefore be always the same. Again, to take a simple case; suppose two men have engaged to throw dice against each other for their whole fortunes. Suppose that each goes over-night to consult a different astrologer in the same town; to them (on a sudden emergency) it might not be necessary to exhibit their horoscopes; the present position of the heavens would be enough to point out a favourable hour; and thus if both astrologers worked by the same rules, which they ought to do, both would arrive at the same result, *i.e.*, the same course would be recommended to both inquirers, though one must certainly lose. In spite of these obvious drawbacks, astrology, no less than Alchemy, found earnest votaries among high and low, ignorant and learned alike. The pursuit of Alchemy was constantly stimulated by infatuation, avarice, and some cases of apparent success. If it made but little gold, it at any rate made away with a vast deal. Pope John XXII was a notorious adept. At the Dissolution, the monasteries were still found widely practising the art.

And now, when you consider weakness and strength, strength and weakness, side by side—when you remember that this 14th century was an age that even in these very studies could boast a depth, an active vigour, and an originality which we can scarcely pretend to equal; that beyond their range it produced poetry like the *Canterbury Tales*, a spirit of enterprise like that of Sir John Mandeville, soldiers like Edward and his eldest son, architecture like the spire of Salisbury; and when on the other hand you consider not too rigidly but sincerely and truthfully how little our splendid intellectual position is due to the efforts of our own or of any single age, to say nothing of the shortcomings even of that position, do you not feel the calming and sobering influence that you sometimes feel in presence of nature herself?

There is methinks but one language to express our sense under such influence of our own comparative littleness and of the greatness of what lies beyond. It is a language in which the devout man and the philosopher can alike unite "Wonderful are thy works, O God, and that my soul knoweth right well."

There were 60 persons present—4 hon. members—19 members, and 37 visitors.

MEETING HELD MAY 1st, 1868.

Archæology.—G. G. Monk exhibited the coins at present in the collection of the Society.

Geology.—E. Almack exhibited a specimen of *Inoceramus*, from Oare Hill.

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Entomology.—F. J. H. Jenkinson gave his report.

Ornithology.—E. Almack exhibited the skull of a Rook *(Corvus frugilegus)*.

Botany.—The President passed round a list of notices for the month of April.

G. Holden exhibited specimens of Moonwort *(B. lunaria)*.

Zoology.—The President exhibited specimens of the Roman Snail (H. Pomatia) found at Ramsbury by T. E. Maclean.

The President also exhibited some Alum Shale and Alum from Whitby.

The Librarian announced the donation to the Society of the "Birds of Bucks and Berks," by H. R. H. Prince Leopold, and of a second copy of the same by the Rev. R. Duckworth.

The President then read the following Paper, written by J. W. Mills, Esq., on

THE INSTINCTS OF ANIMALS.

The subject, which I have the pleasure of bringing before you this evening, is one which is well calculated to rouse the attention of all members of a Natural History Society, particularly because it refers to, as it were, the connecting link between man and brute, the verge on which reason and these wonderful powers, which an all-good Creator has given to the inferior creation, come into close contact. Nor is Instinct a faculty which is to be found in a few only of the brute creation; it seems to be the property, though in various degrees and different forms, of nearly all the creatures who are less gifted than the human race. From the little ant which works so industriously at our feet to the mighty elephant which roams through the forests of India and Africa, crushing the frail underwood before him, and trampling on myriads of little creatures no less gifted, perhaps, than himself, we find in all these certain passions, and certain instincts which we may well examine into and admire. Now I propose to divide my paper into various heads as I go on, and with an anecdote or two in each, try to impress upon you all that the human race is not the only one which is gifted with senses and feelings. Aristotle tells us that beasts and infants remember—that is recognize—and that man alone recollects. These distinctions, hard no doubt to define, are scarcely however borne out by fact, for in animals which have been trained to any particular purpose, the faculty employed in its performance must be more than recognition, which can only apply to a material object. A dog will recognize its master, but it must be an effort of recollection which enables it to perform the tricks it has been taught, or the services it is called upon to render. Most animals recollect injuries they have received and this cannot be recognition. The dog will recognize the person who has inflicted the injury; but there is something beyond the recollection, namely, an association of something more, that it suffered ill-treatment from him. Now this faculty is entirely distinct

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from *instinct proper*, which in animals is equivalent to the reason and mental power in man, and which teaches them the means of self-preservation by migration, hybernation, and concealment, the periods for propagating their species, and the contrivances for taking care of their young; and the difference between these—reason and instinct—is this: *Reason* has an object or aim in view, founded on some mental calculation or desire, the result of some wish or will of the moment, while *instinct* is a blind impulse, which compels the animal to certain actions capable of being modified or suited to circumstances without depending on them. However, by the heading I have given to my paper you will see I have included other faculties under the term *instincts*, and as such I wish to class them, though perhaps I may, strictly speaking, be giving a wrong name to these wonderful powers; and really a subject of this sort is a truly marvellous one, the closer we look into the ways and means of the animal world the more we see to marvel at, and to use the words of a great writer, 'The more we know, the more we see our ignorance."

The first branch of the subject I would bring before you, is *instinct proper*. Now this I have already said corresponds to our reason, and in some cases appears almost, if not quite, identical with it. It is however not capable of improvement, but at once assumes the highest range to which it can rise; for perfection is only to be gained by experience, and to that the faculty of thought is essential; in fact, a desire (founded on the clear perception of the object desired), seems to be instinct. As an exemplification of instinct I will relate a story that was told me by a gentleman a little time ago, of the authenticity of which I have not the slightest doubt.

A lady residing in Staffordshire was presented by a friend with a little pig. This friend lived some 4 or 5 miles off, and between the places where each resided was a considerable town near which a river flowed, which had to be crossed by a bridge. This pig was conveyed to the house of this lady in a cart along this road, over the bridge (to reach which somewhat of a detour had to be made) through the town, and reached the house all safely. The next day piggy seemed very restless, and the day following he was missing, and news soon came that he had returned to his old and favourite stye across the river. Well, he was brought back, he again appeared restless, and so this time the gardener watched him. He saw him deliberately make his way out of the yard, and go on through the town to the river, *not along the high road* but in *a straight line* to the house from which he had first been taken, swim the river, and proceed thence to his old stye with, as it seemed, intense satisfaction to reach his old home again.

This really seems to be a wonderful example of instinct. What particularly strikes one is the pig's returning—not along the road and over the bridge, the way he had come—but by a straight cut *through* the river.

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An instance, however, which will shew that this wonderful power is not equally present in all creatures will, I think, be afforded in a letter published some years ago superscribed, "The Shade of Isaak Walton to the fishes of the Thames," which was as follows:—"I will tell you a pleasant story, it happened to myself as I once sat on a bank a fishing; a certain wicked perch that had a design upon my bait, (for, as I have already told, fishes do not bite to please anglers, but to please themselves), was approaching thereto, when suddenly pulling my line out of the water, I caught him (which made me very sorry) by his very eye, which came, to my real grief, clean out of his head, and in this my grief I think I was to the full as sincere as they that make, as it were, a trade of sorrow. But for this fish, I thought him to be like those soldiers or sailors that having become maimed, whether in a good or bad cause, did deserve a relief from all future wars, so I quickly returned him to his native element, there to abide his chance to meet no more with hook or line; but mark my wonder, when returning my thus ready baited hook to the water, and with this so singular bait (*i.e.*, his own eye) I caught the next minute the self-same perch, who thus became so like a phenomenon that he had one eye in his belly and the other in his head." If this story be true, the fish must have been utterly devoid of sense of all sort to be so infatuated as to bite at his own eye.

Cuvier relates the anecdote of an ourang-outang in the menagerie at Paris, which was in the habit of opening the door leading into a dining-room, the lock of which was out of its reach, by lowering itself by a rope fastened to the ceiling. This being observed the cord was fastened by means of several knots, but the animal seeing the reason, and at the same time perceiving that by hanging beneath them he drew them tighter by his weight, climbed above them and loosened them with ease. It also unlocked a door by trying every key in a bunch till it found the right one, and if the lock was too high it fetched a stool and mounted on it.

Lemet also saw a monkey escape from its cage, run through a gallery, and bolt the door after it, and then conceal itself in a closet *from which it first took the key*.

Now does it not seem that in both these cases the animal must have made use of actual thought and reason to accomplish what it did.

Leaving now the subject of instinct proper, I will now remind you of their *affection*, both for their young and for their masters and preservers. We all know the artifice employed by the Lapwing to ward off danger from the proximity of her young, how she will rise from the ground with a loud screaming voice as though from her nest, though probably not within a hundred yards of it. She now flies with apparent anxiety, making a great noise, striking at the invaders with her wings, and flying apparently wounded a few

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yards in front, and it is a curious fact, and one worth remembering, that the nearer one gets to the nest the less she cries.

Hence round the head—
Of wond'ring swains, the white wing'd Plover wheels
Her sounding flight, and then directly on
In long excursion skims the level lawn
To tempt them from her nest.

A story is told by Mr. Markwick that as he was once hunting with a young pointer, the dog ran on a brood of very small partridges. The old bird cried, fluttered, and ran tumbling along just before the dog's nose till she had drawn him to a considerable distance, when she flew further off, but not out of the field. On this the dog returned close to the place where the young ones lay concealed in the grass, which the old bird no sooner perceived than she flew back again, settled just before the dog's nose, and a second time rolling and tumbling before him succeeded in drawing his attention off her brood, and so preserved them. We all probably remember the account which Captain Cook writes of the affection of the female walrus, which will defend the young one to the very last at the expense of her own life, nor will the young one quit the dam though she be dead; so that if you kill the one you are sure of the other. He mentions in the account of his third voyage, on returning from Behring Straits; "Our people were more successful than they had been before, returning with three large ones, and a young one. The gentlemen who went on this party were witnesses of several remarkable instances of parental affection in these animals. On the approach of our boats towards the ice they all took their cubs under their fins and endeavoured to escape with them under the sea. Several whose young were killed and wounded and were left floating on the surface, rose again and carried them down, sometimes just as our people were going to take them into the boat: and they might be traced bearing them to a great distance through the water which was coloured with their blood. We afterwards observed them up at times above the surface as if for air, and again diving under it with a dreadful bellowing. The female in particular, whose young had been destroyed and taken into the boat, became so annoyed that she attacked the cutter and stuck her teeth through the bottom of it:" and then follows in the record of another expedition the touching description of the way the other Polar Bears came up and mournfully licked over their cubs which had been killed and left for a short time on the ice.

Mr. Anderson in his "Recreations in Agriculture" says that the Russian shepherds avail themselves of the attachment of ants to their young for obtaining with little trouble a collection of their pupæ which they sell as a dainty food for nightingales. They scatter an ants' nest upon a dry plot of

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ground, surrounded with a shallow trench of water, and place on one side of it a few branches. Under these the ants, having no alternative, carefully arrange all their pupæ, and in an hour or two the shepherd finds a large heap clear and ready for sale.

So much for the affection animals feel for their young, and I think I need hardly illustrate the affection which dogs and horses feel for their masters. We all know the story given so beautifully by Sir W. Scott of the dog who, when his master was lost on Helvellyn, kept watch over the body without leaving the place for more than three months: but to show that this feeling is not confined to dogs and horses I will mention a story told by Mr. Johnson in his "Field Sports of India." He says 'Two Biparies (dealers in grain) were driving a string of loaded bullocks to Chittrah from Palamow, and when they were within a few miles of the former place a tiger seized a man in the rear, which was seen by a guallah (herdsman) as he was watching his buffaloes grazing. He boldly ran to the man's assistance, and began to cut the tiger severely with his sword, on which he dropped the Biparie and seized the herdsman; the buffaloes observing it attacked the tiger, and rescued the poor man; they tossed the tiger about from one to the other and killed him. The Biparie recovered, but the herdsman died.' Elephants too, we know, are wonderfully docile and affectionate: and Sterne in his 'Sentimental journey' tells us of the man mourning for his dead ass, which ass, he said, he was assured loved him.

We all see then that animals shew extreme affection for their young, and also for their masters in a great many cases.

Fear is another feeling which has great power in the animal world.

We hear of the effects of the Rattlesnake's terrible eye: how by merely keeping its eyes fixed on a squirrel it compels it to come down from the top of a tree, and then kills and devours it. M. La Vaillant tells us a story of a shrike, also of a mouse, falling victims to fear at the sight of a rattlesnake. He saw on the branch of a tree a species of shrike trembling as if in convulsions, and at the distance of nearly 4 feet, on another branch, a large species of snake which was lying with outstretched neck and fiery eyes, gazing steadily at the poor animal. The agony of the bird was so great that it was deprived of the power of moving away, and when one of the party killed the snake, the bird was found dead upon the spot, and that entirely from fear, for upon examination it appeared not to have received the slightest wound. He also tells a similar story of a mouse in similar circumstances, which, when he frightened the snake away, immediatly expired in his hand. There is rather a peculiar story told in Captain Alexander's 'Transatlantic Sketches' of two rattlesnakes which a stout negro, belonging to a friend of his, brought from the bush in a

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box. They became completely subdued by intimidation, and after a time he would let them out in the verandah, and they would return when he called. One day they were missing; the negro's master on going to an outhouse saw them coiled up close under the step of the door. He was a long time in a terrible fright, but at last sprung into the open air over them and sent the negro with his box to catch them. So he went out and on on seeing them called out "ah! you d—— rascal, you go away! get in house this minute!" and the reptiles obeyed him. If this be true, the tone of the man's voice must, I suppose, have been attended with such fear to the creatures that they obeyed him.

Impulse for food is another instinct which we see strongly marked in all the members of the animal world, excited, as it is, by the cravings of hunger, in itself more ferocious than the animals themselves. This natural craving and its means of gratification is well commented on by Mr. Kirby, who says that nothing affords a more striking proof of creative wisdom and of the most wonderful adaptation of means to an end, than the diversities of structure, with a view to their particular functions, meaning the different modes by which animals procure their food. He then goes on to describe the various organs for swallowing and digesting in different animals.

Stratagems are employed by various creatures with a view to obtaining objects to devour. The pit-falls of the ant-lion, the webs and nets of the various sorts of spiders spread over the trees, the fascination of the rattlesnake, which I have already mentioned, furnish instances of stratagems to secure their daily food. Others, birds, &c., obtain their food from berries of trees, and Mr. Dampier in his travels tells us that when seamen are thrown upon any of the unknown shores of America, they never venture upon the fruit of any tree, however tempting it may appear, unless they observe that it is marked with the peckings of birds; but eat it without apprehension where the birds have been there before them.

What wonderful powers of perception these herbivorous and graminivorous creatures must have to be able to choose the right food and no other. Linnæus tell us that the horse eats 262 plants, and rejects 212, the cow eats 276, and rejects 218, the goat devours 449 and declines 126, while the sheep takes 387 and rejects 141, the hog, however, being more nice in its provision than any of the former, eats only 72 plants, and rejects 171.

The great majority of carnivorous animals reject dead substances. Our cat at home, for instance, utterly refuses a dead mouse, while she particularly admires a live one.

The craving for food varies considerably in respect to time. Herbivorous animals can only endure fasting for a very short period, while the carnivorous

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can exist without food sometimes for weeks. Horses and the ruminating animals sink through hunger at the expiration of a week at the latest. We are told, that in a Baltic Trader from St. Petersburg to Leith a cargo of flax was put on board, and when this was unloaded a cat was found in one of the bundles, and much compressed within it, but still alive, though this was 38 days after the vessel started. The ant-lion, whose pit I mentioned just now, can fast for half a year after its last meal.

Migration is, to a large extent, caused by the necessity of seeking food. As soon as herbage and green food begin to be destroyed in any place by the frosts and snows in winter, the various animals wander forth to a warmer and more congenial atmosphere.

The Lemming rats, which inhabit the mountains of Norway and Sweden, and multiply very largely there, emigrate as Linnæus says, about once in ten years, and travel regularly in a direct line from N. to S.W., causing destruction to herbage wherever they pass. They keep on their course in a perfectly straight line, swimming lakes, and passing over vessels, if in the way, and curiously enough move chiefly by night or early in the morning.

The Passenger Pigeons' wonderful flights, are also actuated by the same impulse of food; driven by necessity they change their situations in search of acorns, mast, and berries, and where they alight, the ground is quickly cleared of esculent fruits.

The *Sagacity* of creatures, particularly *dogs*, is a trait of their character which is noticed so generally that it would be out of place to dilate long upon it here. However I will relate a circumstance which I myself witnessed last summer in our yard at home.

I was looking out of a window and saw a fox-hound come into this yard. There were several of these dogs kept by the farmers in the village, and all regarded with disgust by us, especially as one would frequently come into our premises on the chance of bones, and would in so doing frighten the fowls, &c., extremely. The gate by which the dog came in happened to be open, but almost directly afterwards the gardener went out, and not seeing the dog, shut the gate, which is one of the sort that swings backwards and forwards; it swung to, but did not latch. After a time the dog wanted to go back again, but unfortunately found the gate too high for him, as there were pieces of wire netting at the top to keep the fowls from flying over, and so went snuffing about trying to find a place to jump over. This he failed in doing, and so returned and began to push the gate about, and finding it somewhat loose tried to push it forwards and squeeze through after it, but it being a considerably heavy gate he could not get it far enough, though he tried some dozen times. So then he tried another plan. He pulled it back and tried to run round it

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and squeeze through before it closed again, but he always found it shut before he could manage that. So then he thought of a dodge. It really seems as if nothing but *reason* could have prompted it. He pulled the gate back as far as he could, and following close upon it as it swung through of course found an exit the other side, and so departed.

Now I cannot myself account for this in any other way than that the dog must have had some power very similar to reason given it, for how could he have known that by bringing it back a long way it would swing through and leave an opening for him the other side? It almost seems as if he thought

Another case of similar powers of instinct in another animal is mentioned in Mr. Jesse's 'Gleanings in Natural History.' He says a clergyman living in the south-east of England had placed a pot of honey away in a closet which had recently been built, and in which some of the plaster rubbish still remained. Some months afterwards he went into this closet to fetch the honey, and was surprised to find a mound of rubbish heaped up against the side of the pot reaching nearly to the top. He did not at first move it, as he was desirous to ascertain what could have caused it, as he knew the closet had been kept locked. So he set a trap and caught a *mouse* which proved to be the culprit. Upon examining the pot he found that the honey had been raised very nearly to the brim by means of throwing in it pieces of rubbish of the same material as the mound, and with which it was nearly half filled. This wonderful fact reminds one rather of the fable by Æsop of the crow which managed to drink out of the vessel by dropping stones into it till the water came to the top, the only difference being that one is a fable, the other an undoubted fact.

The *Language* of animals is another point which we will examine next, and here of course it is very difficult to find out for certain how animals do communicate their wants and wishes to each other. The lower orders of creatures, particularly insects, communicate by signs, and the organs employed for that purpose are the feelers (antennæ) as in bees and ants, all of which like every other animal living in society require a medium of communication.

It is clear that bees use their antennæ as organs of communication, as Mr. Huber tried various experiments by amputating them altogether, and the results were curious. The queen bee ran about the combs, dropped her eggs anywhere, and became quite helpless: the workers neglected their labours, ran into corners, or some sunny spot, and soon quitted the hive for ever. The sentinels too of the beehive on a moonlight night may be seen patrolling round their habitation with these feelers stuck out, and if some wretched moth, which is endeavouring to steal into their habitation, come in contact with them, the signal is made and a body of guards rush out to punish the interloper.

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Ants seem too to recognize each other after long absence. Mr. Huber once took an ant-hill from the woods, and put it in a glass hive, and finding he had too many ants he let some escape, and these found a nest in the garden. He then took the glass hive and its contents into his study and observed their habits for 4 months, when he put the hive in the garden, a few paces off the natural nest. Immediately the ants in it recognized their former associates, from whom they had been separated for so long a time; they caressed them with their antennæ, and (a strong proof of their affection) took them up in their mandibles and carried them to their own nest.

We remember the story of Dr. Franklin hanging his jar of treacle in his closet from a string fastened to the ceiling. However one ant happened to be left in the pot, and it crawled up the string and along the wall to its nest. In less than half an hour a whole army of ants sallied forth from their hole, down the string, and devoured all the treacle. This new mode of reaching the treacle must have been communicated by the first ant to all the others, so they clearly have some means of communication. We know well that frequently dogs, when their masters have met with some mishap will run home and by whining, scratching, and jumping on people will try to draw them on to follow it to the place where its master lies.

A curious incident is related by Mr. Thompson, as having occurred at Gibraltar, which is the only place in Europe where monkeys exist in a wild state, which the observer describes as a 'monkey court.' He saw a troop of monkeys bringing in an old grey-headed baboon as a prisoner. He says they arrived, halted, and detached their prisoner to a small distance, where he remained between two monkeys, who had the charge of him. The rest formed a sort of court, before which an advocate evidently accused the prisoner of some offence, while the prisoner kept on weeping, screaming, and frequently interrupting the attorney-general. Indeed the proceedings seem to have been rather singular, as judges, advocate, and prisoner were all screaming together. At length an old monkey screamed louder than the rest, and the prisoner was instantly hurried off and precipitated over a projecting rock. The soldiers who were looking on (one of whom relates this incident) were much scandalized by this proceeding, being convinced that old baboon was sacrificed under some false accusation to prevent his being burdensome to the parish.

I might go on further, and relate stories of other animals communicating their wishes to each other and also to mankind; but I think I need hardly do so, as we all know that the hen is understood by the chickens, the duck by her ducklings, the cat by the kittens, &c., and that such probably is the same with all creatures.

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Another trait in the character of most animals is *gratitude*. A surgeon at Dover, seeing a terrier dog in the street, which had received some injury took it home and having cured it in a couple of days let it go, and for many weeks the animal used to pay him a daily visit of a few minutes, and after a vehement wagging of his tail, scampered off again to his own home. Examples of this kind might be multiplied, and we also know of many touching instances of mutual fidelity and attachment in animals towards each other, particularly if they have been long associates. Rats, parrots, cranes, ostriches, hares, dogs, and even lions have been known to evince most unmistakeable marks of affection towards their benefactors.

I think now I have said almost enough to convince you that inferior creation is endowed with wonderful powers and instincts, all of which shew us the marvellous beauty of the mechanism and examples of nature. I think I cannot do better than conclude with a remarkable instance of the domestication of the seal, mixed up with a dreadful tale of Irish superstition, which is related in the "Wild Sports of the West."

About 40 years ago a young seal was taken in Coen bay and domesticated in the house of a gentleman, who lived on the sea shore. It grew apace and became familiar with the servants and attached to the house and family; it was quite gentle, played with the children, came at its master's call, and was as the old men expressed it, as fond as a dog and as playful as a kitten. The seal used to go fishing daily, and after providing for his own wants, frequently brought home a salmon or turbot to his master. He had been 4 years thus domesticated, when a fatal disease called 'the crippawn' attacked some black cattle belonging to the master of the house; some died, others became infected, and the customary cure produced by changing them to other pasture failed. A wise woman was consulted and the hag assured the credulous owner that the mortality among his cows was occasioned by his retaining an unclean beast about his habitation—the harmless and amusing seal. He was told to send the seal away or the disease would continue. The superstitious wretch consented to the hag's proposal; the seal was put in a boat and carried out to sea and there left to shift for himself. The boat returned—the family retired to rest—and next morning the servant awoke her master to tell him the seal was sleeping in its usual place—the oven. Next morning a cow was reported to be unwell; the seal must be finally removed. A Galway fishing boat was leaving Westport on her return journey, and the master agreed to take the seal and not put him overboard till he had got some leagues off. It was done, a night and day passed, the second evening came, the servant was raking the fire for the night when something scratched at the house door. She expected it was of course the house dog. She opened it and in came the

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seal, which with expressions of pleasure stretched itself before the fire and went to sleep. The master of the house was of course informed, and the old dame was consulted at once. She suggested that the animal should be deprived of sight, and then carried out to sea a third time, as it was unlucky to kill a seal. This hellish proposition was consented to, and the affectionate and confiding creature was cruelly robbed of sight and again, writhing in agony, was committed to the sea. A week passed and things became worse instead of better, the cattle died and the old hag at last gave out that her power was useless. On the eighth night after the seal had gone, a great storm of wind came on, in the pausing of the storm a wailing noise was faintly heard at times at the door. The servants, who slept in the kitchen, concluded that the Banshee had come to warn them of an approaching death, and buried their heads in the bed clothes; when morning broke the door was opened, and the seal was found lying dead upon the threshold. The emaciated skeleton of the poor animal was buried in a sand hill, and from that moment misfortunes followed the perpetrator and abettors of the horrible deed. The old hag was within 12 months hanged for the murder of her own grandchildren. Everything about the devoted house melted away, the sheep rotted, cattle died, corn was blighted, of several children none came to maturity, and the savage proprietor survived everything he loved and cared for. He died *blind* and miserable. There is not a stone of that accursed building standing on another. The property has passed to a family of a different name; and the series of incessant calamities which pursued all concerned in this cruel deed is as romantic as it is true.

Such is this story, and it really seems as if a judgment came upon this house in return for their so cruelly ill-treating this affectionate creature.

In concluding my paper this evening, I may add, that we have thus seen that nearly every animal which treads or crawls upon this earth, the fishes and other creatures which live in the sea, all have instincts and powers as wonderful as they are manifest, and I hope in future we shall be careful of the lives of creatures which do us no harm, but which if we examine them will afford us a vast amount of pleasure combined with profit, and also willing and anxious to impart to others the same feelings of humanity; and well may we all say with Adam—

> "These are thy glorious works, Parent of good,
> Almighty, this Thy universal frame,
> So wondrous fair."

There were 70 persons present—2 hon. members, 21 members, and 47 visitors.

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MEETING HELD MAY 15TH, 1868.

THE following donations were announced and thanks ordered to be given to the donors :—

A large collection of Birds' Eggs by H. C. Mercer, Esq.

"Geology for the Million," by — Strickland.

"Coin Collectors' Manual," 2 vols., by G. G. Monck.

Archæology.—G. G. Monk, exhibited silver 1d., 1½d., 2d. pieces, and various other coins.

Ornithology.—E. im Thurn passed round a long list of notices obtained since April 1st, and exhibited the Italian variety of the Common Quail (Coturnix vulgaris), the only recorded instance of its occurring in England. It was picked up dead on the high road near Rockley, and differs from the ordinary Quail in having a *black* throat.

Botany.—The President exhibited a Cotton Plant from Egypt, some curious prickly leaves, and the flower of a species of *Datura*, from Bazil, and a specimen of the Hen-and-Chicken Daisy.

Geology.—E. Almack exhibited a specimen of *Nautilus Elegans.*

There were also exhibited the skull of a Donkey, and bone with the earthy matter removed, by the President, and Spanish and Caucasian Daggers by E. S. Preston.

The old Editing Committee were re-elected, and C. F. Harrison, T.W. Harvey, W.D.Fenning, L. C. Calley, and A. D. B. Hovell were elected members.

G. H. Holden then read a paper on Rats.

After the paper an animated discussion took place in connection with the subject.

There were 70 persons present—4 hon. members, 19 members, and 47 visitors.

MEETING HELD MAY 20TH, 1868.

THIS was a special meeting held for the purpose of exhibiting objects obtained during the whole holiday.

The following were exhibited by E. im Thurn :—Ivy-leaved Crowfoot *(R. hederaceus)*, Caper Spurge *(E. Lathyris)*, Water-violet *(Hottonia palustris)*

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and Cotton-grass (*Eriophorum*), gathered near Reading by F. J. H. Jenkinson; also a variety of the lady fern (*A. Filix-fœmina*) Clematis, Mountain Avens (*Geum Montanum*) *Hoya carnosa*, *Vinca alba*, Service Tree (*Pyrus domestica*), *Liatris spicata*, &c.; also a nest and eggs of the Nightingale (*Pilomela luscinia*) taken on the 29th by F. J. H. Jenkinson, near Reading, and a nest and pair of birds of the Dartford Warbler (*Melizophilus Dartfordiensis*); he also mentioned the fact of a rat having entered into a large pot of *Maidenhair Fern* by a hole in the side. It had then eaten a large portion of the roots, and when discovered, had a litter of young ones in the hole thus formed.

There were also exhibited Eggs of the Stone Curlew, from Overton Downs, by G. Holden; claws of Lion and Leopard, from India, also by G. Holden; skin of Common Snake, and larva with Ichneumons, by R. M. B. Glasse; Fibrous Iron Ore and other Minerals by W. Greg.

MEETING HELD MAY 29TH, 1868.

The following objects were exhibited:—

Geology.—The following fossils from the Lower Chalk at Bignal:—*Ammonites Giganteus*, *A. Varians*, *A. Mantellii*, *Turrilites Costatus*, and *Inoceramus Cuvieri*, by E. Almack.

Archæology.—Coins of the reigns of Henry IV., Edward IV., Elizabeth, &c., presented to the Museum by G. G. Monck and E. C. Sewell.

Ornithology.—A male egg of the Ostrich by the President.

Botany.—Specimens of *Marchantia polymorpha* (exhibiting fructification), *Cephalanthera Grandiflora* (found by E. im Thurn in Rabley Copse), monstrosity of Garden Anemone, and *Chætophora Elegans* (a Conferva), some of which was also exhibited under the microscope, by the President.

Zoology.—Peculiar species of Slug by the President, and a small Sun fish by H. Manders.

The President then read a paper on the Common Dandelion (*Leontodon Taraxacum*), illustrated by diagrams and specimens.

H. J. Verrall and E. L. Hesketh were elected ordinary members.

There were 64 persons present—2 hon members, 22 members, and 40 visitors.

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MEETING HELD JUNE 12TH, 1868.

EXHIBITIONS.

Geology.—Grey wethers with marks of rain and stained by iron, by E. Almack, who also gave a summary of the work of the section during the half year.

Archæology.—The collection of Roman Coins belonging to the society by G. G. Monck.

Entomology.—F. Jenkinson gave his report.

A nest of wild bees destroyed on the larvæ of *A. Colonella*, by the President.

Ornithology.—A specimen of Wryneck (*Yunx Torquilla*), by E. im Thurn, who also announced that he had presented his extensive collection of bird's nests to the Society.

Specimens of Blue Wren, Leatherhead, and Green Pigeon from Australia, by G. Holden.

A pair of Pied Wagtails (*Motacilla Yarrellii*) and nest presented to the Society by W. J. Pratt.

Botany.—Specimens of "Job's Tears," the seed *Coix Lacryma* from Jamaica, by the President.

Fossilised Oak from Shropshire, by E. C. Sewell.

There were also exhibited an American Snake, and Peacock Copper Ore from Cornwall, by E. C. Sewell; and Lava from Vesuvius, with the cavities filled with Carbonate of Lime, and specimens of fossilised wood, by W. Greg.

W. Fergus, Esq., M.D., then gave a lecture, illustrated by numerous diagrams, on "The Organ and Sense of Smell."

S. Image was elected Secretary, and G. E. Manisty member of the Committee for the coming half-year.

There were 77 persons present—2 hon. members, 28 members, and 47 visitors.

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CORRESPONDENCE.

In order to secure a more lively interest in the welfare of the Society amongst the members after they have left the School, it has been decided to institute a number of "Corresponding Members," who are invited to make notes upon the Natural History of the country in which they are residing, and to forward the same to be read at the meetings of the Society, and to be published in the Half-yearly Report. The following "Notes" were supplied for that purpose by F. Bonney, who, though not an old member of the Society, would certainly have been among its Members had the Society been in existence whilst he was at the School.

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FOREIGN CORRESPONDENCE.

MOUNT MURCHISON, RIVER DARLING, AUSTRALIA,
SEPT., 1866.

I expect you will like to hear something of the natural history of this strange country, so I will endeavour to give you some information in this letter. When I came here the country was parched and dry, but in January last the drought of nearly two years was broken by the fall of much rain. After that vegetation was renewed and everything flourished; birds, reptiles, and insects, are now plentiful although scarce before the rain; but Australia is I think rather destitute of animal life. In this district (long. 143, E. lat. 31° S.) the kangaroo is not plentiful or generally distributed, but in some few places in the back country, *i.e.* back from the river it is common. Emus, in a good season like the present one, are frequently to be seen, they have lately been breeding and their eggs have often been found in the back country. The emu builds no nest, but lays its eggs, sometimes as many as eleven in number, on the bare ground, and frequently away from any bush or shelter. The spot chosen by the bird is a sandhill, not far from a waterhole of some kind, so that by following the tracks from about the waterhole on to the sandhills, their eggs are usually found; they are valuable in this country, as silversmiths mount them handsomely in silver to form cups of different kinds. I have obtained two beauties, and hope shortly to procure more. The egg is about 5½ inches long and 3½ in diameter; colour, dark green, with a rough surface. The black swan is also common on the small lakes in this neighbourhood, the egg is of the same colour as that of the white swan but smaller; they trample down the middle of a small close-growing bush, and lay their eggs, sometimes as many as twelve, in the hollow thus formed. I have some of their eggs and also a young swan, which I hope to rear, for it is very tame and doing well. I had a pair of them given me but the carrion crows robbed me of one. Crows and hawks abound here; the former are more destructive than the latter; it is the real carrion crow. The pelican is common on the rivers and lakes, but the eggs I have not seen as they are seldom found. Both the white and the black species of cockatoo are very plentiful, they fly about in large flocks,

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feeding on the plains, and roosting in the gum trees by the river. The black cockatoo you probably have not seen, for it is not met with in many parts. It is black all over excepting in the tail, the feathers of which are black and red. It is a very savage bird and has a far more powerful bill than the white species. The native names are—black cockatoo, *Day yarru*: White cockatoo, *Kaiuke*. There are great numbers of several small green kinds of Parroquets.

There are not, I think, many kinds of butterflies here, but a great many moths, some of which are very large.

MOUNT MURCHISON, RIVER DARLING,
MARCH 18TH, 1867.

The gum tree I think makes the country where it grows look pretty. In growth it resembles the English oak, more than any other tree I know; it grows to a great size sometimes, having a gigantic trunk; generally the timber is large as I believe I have already told you: it only grows near rivers and watercourses. On account of the line of these trees on each bank, the "river timber" as we call it, is visible a great distance off. It can always be distinguished from other timber by its blueish appearance, size, and regularity, for there is seldom a break in it about here. I have seen the river timber 10 miles distant from me, that is, over country that is tolerably level. From a high spot it is visible at a great distance, for the atmosphere here is very clear excepting in the middle of the day in warm weather, when the distance is hazy and generally hidden by the mirage.

The colour of the bark of the gum tree, I think adds greatly to its beauty. If I remember rightly it is something like the bark of the beech tree, of various colours, white near the upper part of the tree, with a pink or greenish tinge, reddish brown, &c., and scales off in thin coats, from the surface. The bark is used by us to roof our buildings and by the natives for making canoes, who can strip it off very swiftly in the proper season. Farther back from the river, away from its banks, and on ground that is occasionally flooded, the box tree grows, it is very similar to the yew, but does not grow to such a size; its flower has a very sweet smell, which on a still evening scents the air very pleasantly.

From the gum tree there falls sometimes in small drops or attached to strips of the bark, a kind of gum which is very good eating, sweet, and has a

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most pleasant flavour. It would be much valued by "lolly makers" at home, I think, for in its natural state it is nearly equal in goodness (I think I may say) to *Webb's choicest* kind. About six weeks ago the blacks were gathering a good deal of it on the banks of the river. I do not think the growth of the tree at all stiff. Our vegetation is not white, only the salt bush and cotton bush. These are both rather white. There are several kinds of salt bush, the large kind or "old man salt bush," grows often to a height of 4 feet, stock are not as fond of this as they are of the smaller kinds, which are fattening, as is also the cotton bush.

There are several kinds of parasites about here. I have specimens of six different kinds; the leaves of some are very similar to those of the English mistletoe, they all flower very freely and the flowers are very pretty.

MOUNT MURCHISON, RIVER DARLING,
MARCH 1ST, 1868.

In this district we have very good water, pure and clear, but in some other parts close by the water is either thick or salt. The water we generally obtain in wells is salt, very often so much so as to be useless for stock or other purposes. We may consider ourselves lucky for out of five wells sunk we have fresh and good water in two of them. The others are useless; our neighbours have not been so successful in their attempts to secure permanent water. Well sinking is very expensive work, as we seldom get a good supply of water in less than 100 feet sinking, and then after all the chances are that the water in the wells will be useless. Wells are a standby for a drought; at present we have not had to use ours. There are a number of creeks with some deep water holes in them which will keep water in them for twelve months after being filled; some last eighteen months. It is only in exceptional seasons such as the drought in 1865, that the creeks dry up; that drought continued for over 18 months, but then we had a large lake filled by a flood from the river for the stock, besides a small quantity of water in the creeks. Since that time we have had occasional rains, keeping water in the creeks. Three weeks ago I thought we were going to have another drought, but a nice rain fell just in time, so now (autumn) the country will be green and fresh all the winter. Grass and herbage grow very quickly here after rains. The ground is like a hot bed, especially on the sand hills, so that you can almost see the grass grow. Now the country looks very nice and pretty, every-

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thing flourishing, and the Mulga scrub covered with yellow blossoms. This is a nice country and a beautiful climate in the winter season, but in summer it is too much like an oven, with the thermometer sometimes up to 115° in shade, and hot winds blowing and every thing dry, besides the annoyance of flies and mosquitoes innumerable. This past season has been too dry for many of the latter, but now since the green grass has sprung up they have appeared; the cold weather, however, will soon make them retire. If you were here now you could make a fine collection of moths and all kinds of insects, for there are numbers of various kinds flying about the lamp while I write this. Bats, moths, beetles, mosquitoes, gnats and small insects; occasionally a *Galii* makes its appearance, I think it must be common here for I have seen several specimens. There are also some most curiously shaped insects; I should like you to see a long wiry insect, about six inches long, which I secured the other night,—it looks like a cross between a grasshopper and "a daddy long legs." It has long legs but no jumpers, small wings, coloured the same as parts of its long body, rose green and white, he would be a curiosity at home but he is too large to send conveniently, and has got damaged through my not having a good box to put him in. A smaller kind of a similar species is common and appears like the dead twig of a bush as it crawls steadily along: the blacks (natives) say that when they come about there will be windy weather, so call them *yertu amucca* (wind mother).

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ENTOMOLOGY.

In this department, considering the absence of many of its members, a good deal of work has been done. Several new species have been taken, and many old ones more abundantly than hitherto.

Those narked H are hybernated specimens.

Those marked * are new to the place.

Names of those whose initials occur in the following list.

A.W.B.	A. W. Banks.
C.S.B.	C. S. Beesley, Esq.
F.J.C.B.	F. J. C. Boles.
G.G.B.	Rev. G. G. Bradley.
F.J.B.	Rev. J. F. Bright.
C.M.B.	C. M. Bull, Esq.
S.M.C.	S. M. Chapman.
L.C.	L. Chapman.
S.F.C.	S. F. Chichester.
W.H.C.	W. H. Churchill.
J.G.C.	J. G. Crosse.
E.H.D.(a)	E. H. Davis, I.
E.H.D.(b)	E. H. Davis, II.
G.H.D.	G. H. Dawson.
J.B.F.	J. B. Fuller.
H.G.	H. Glasse.
B.J.G.	B. J. Guillemard.
J.H.	J. Hamilton.
E.L.H.	E. L. Hesketh.
E.im T.	E. im Thurn.
F.J.H.J	F. J. H. Jenkinson.
H.A.J.	H. A. Johnson.
M.J.K.	M. J. Knubley.
D.E.L.	D. E. Leighton.
W.H.M	W. H. Macdonald, Esq.
P.T.M.	P. T. Macquoid.
H.M.	H. Manders.
G.M.	G. Manisty.
W.M.	W. Mansell, Esq.
G.C.M	G. C. Mansel.
C.M...	C. Marrett.
S.M.	S. Morse.
J.B.O.	J. B. Oakeley.

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E.P. ... . E. Peters.
W.G.P ... ... W. G. Phillimore.
W.J.P. ... ... W. J. Pratt.
E.S.P. ... ... E. S. Preston.
T.A.P. ... ... Rev. T. A. Preston.
C.A.S. ... ... C. A. Sladen.
M.H.S ... ... M. H. Smith.
S.D.S. ... ... S. D. Smith.
J.S. ... ... Rev. J. Sowerby.
G.T.S ... ... G. T. Spencer.
F.S. ... ... F. Storr, Esq.,
H.C.W. .... H. C. Warren.
G.A.W.. ... ... G. A. Wright.

RHOPALOCERA.

Name.	*Date.*	*Captor.*
Gonepteryx Rhamni ...	H Feb. 14—Mar. 14	H.M.—C.S.B.
Pieris Brassicæ	Mar. 31	C.A.S.—S.M.C.
P. Rapæ	Mar. 12 & 14 ...	J.S.—C.M.B.
P. Napi	seen Mar. 4	M.H.S.
Anthocharis Cardamines	seen April 26	J.H.
	taken May 6	H.M.—L.C.—E.H.D.(b)
Lasiommata Ægeria	May 6	F.J.H.J.
L. Megæra	May 9	J.S.
Hipparchia Janira	June 2	B.J.G.
Cœnonympha Pamphilus ...	May 7	J.B.F.—E.L.H.
Cynthia Cardui	May 28	J.B.F.
Vanessa Atalanta	May 6	F.J.H.J.
V. Io	H Mar. 15	C.A.S.
V. Urticæ	H Feb. 11, 15, 20 ...	J.S.—G.G.B.—J.F.B.
V. Polychloros	H April 18	C.A.S.
Argynnis Selene	May 19...	H.C.W.
A. Euphrosyne	May 9	F.S.
Nemeobius Lucina...	May 20...	G.T.S.
Chrysophanus Phlœas	May 19...	S.D.S.
Polyommatus Alsus	May 27...	F.J.H.J.—F.J.C.B.&J.B.F. E.L.H.
P. Alexis	May 18...	H.M.
P. Agestis	May 19...	J.B.F.—H.C.W.—F.S.
Thymele Alveolus	May 6	J.B.F.—E.L.H.
Thanaos Tages	,, ...	

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Name.	*Date.*	*Captor.*
Pamphila Sylvanus	May 22...	J.B.F.
	HETEROCERA	
SPHINGINA.		
Procris Statices	May 27...	E.L.H.
Anthrocera Filipendulæ	... June 18	F.J.H.J.
Smerinthus Ocellatus ...	... June 12	D.E.L.
Sphinx Ligustri	... June 6	W H.M.
Chærocampa Elpenor ...	... June 6	W.H.M.
C. Porcellus	... June 1	G T.S.
Macroglossa Stellatarum	seen Mar. 6	E.im T.
„	taken May 14	G.M.—F.S.
Sesia Fuciformis	... June 14	C.M.B.—F.S.
	BOMBYCINA.	
Hepialus Humuli	... June 12	G.A.W.
Cossus Ligniperda ...	20 larvæ Mar. 6	J.B.F.
Diloba Coeraleocephala ...	larvæ May 16	F.J.C.B.
Pygæra Bucephala...	... larvæ May 11	W.H.C.
Dasychira Pudibunda ...	... May 12	E. im T.
Porthesia Auriflua ...	... larvæ May —	F.J.C.B.
Gnophria Rubricollis ...	... June 8	J.B.F.
Nudaria Mundana ...	... June 18	C.M.
Arctia Caja	... larva April 9...	J.G.C.
Nemeophila Plantaginis	... May 20	F.S.
Spilosoma Menthastri ...	... May 13	E.H.D.(a)
S. Lubricepeda	... May 23	J.B.F.
Diaphora Mendica ..	.. ... May 18	E.imT.
Callimorpha Jacobææ ...	... May 16	T.A.P.
Odonestis Potatoria	... larva April 17	F.J.C.B.
Cilix Spinula	... ... May 20	W.M.
Platypteryx Lacertinaria	... May 15	G.C.M.
	NOCTIUINA.	
Briophila Perla	... June 14	F.J.H.J.
Acronycta Psi...	... June 8	F.J.C.B.
Xylophasia Lithoxylea ...	... June 17	F.J.H.J.
X. Polyodon	... ... June 13	E.P.
Mamestra Brassicæ ...	... May 29...	F.J.H.J.
Apamea Basilinea ...	... ... June 4	
Miana Strigilis	... June 3	F.J.C.B.
Grammesia Trilinea ...	... May 18	W.G.P.

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Name.	*Date.*	*Captor.*
Caradrina Cubicularis	June 19	F.J.H.J.
Agrotis Exclamationis	June 2	F.J.H.J.
Triphœna Pronuba...	June 11	H.G.
Noctua C.-nigrum	May 28	F.J.H.J.
Tæniocampa Gothica	Mar. 22	T.A.P.
Scopelosoma Satellitia	H. Feb. 29	E.S.P.
Phlogophora Meticulosa ...	Apr. 26	P.T.M.
Hadena Dentina	June 7	F.J.C.B.
H. Oleracea	May 18	F.S.
Cucullia Umbratica	June 1	S.M.
Plusia Chrysitis		
P. Iota	May 25...	
P. Gamma	May 21...	H.C.W.
Gonoptera Libatrix ...	H Mar. 14	S.F.C.
Euclidia Mi	May 11	J.B.F.
E. Glyphica	May 19	F.S.
Phytometra Ænea...	May 8	F.J.H.J.
	GEOMETRINA.	
Rumia Cratægata	April 17	G.C.M.
Eurymene Dolobraria ...	seen June 2	F.J.H.J.
Selenia Illunaria	Mar. 15	T.A.P.
Odontopera Bidentata	May 15...	G.M.
Amphidasis Prodromaria ...	Mar. 22	H.A.J.
A. Betularia	April 26	M.J.K.
Hemerophila Abruptaria ...	May 9	J.B.F.—B.J.G.
*Cleora Lichearia	June 17	F.J.H.J.
Iodis Lactearia	May 13...	H.M.
*Ephyra Trilinearia	May 6	F.J.H.J.
Asthena Candidata	May 13...	F.J.H.J.
A. Luteata	June 3	J.B.F.
Acidalia Scutulata...	May 27...	F.J.H.J.
A. Virgularia	June 18	F.J.H.J.
A. Aversata	June 22	F.J.H.J.
Cabera Pusaria	May 6	G.C.M.
C. Exanthemata	June 2	F.J.H.J.
Corycia Punctata	May 29...	F.J.H.J.
C. Taminata	May 8	J.B.F.
Strenia Clathrata	May 6	J.B.F.—E.L.H.
Lozogramma Petraria	May 7	H.M.

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Name.	*Date.*	*Captor.*
Minoa Euphorbiata	May 21...	F.J.H.J.—J.B.F.
Ligdia Adustata	June 10	C.A.S.
Lomaspilis Marginata	June 2	F.J.H.J.—F.J.C.B.
Hybernia Rupicapraria...	about Feb. 17...	
H. Leucophearia	Mar. 2	J.B.O.
H. Progemmaria	Mar. 22	E.im T.
Larentia Miaria	May 13...	G.C.M.
Emmelesia Blandiata	May 29...	F.J.H.J.
Eupithecia Pumilata	April 13	J.B.F.
E. Rectangulata	June 16	F.J.H.J.
Melanthia Ocellata	May 13...	G.C.M.
Melanippe Biriviata	May 6	F.J.H.J.
M. Montanata...	May 16...	H.M.
M. Fluctuata	April 20	W.J.P.
Coremia Propugnata	May 28...	C.A.S.
C. Ferrugaria	May 2	G.C.M.
Camptogramma Bilineata ...	May 29...	P.T.M.
Scotosia Dubitata	May 8	G.M.
Cidaria Corylata	May 21...	F.J.H.J.—J.B.F.
C. Russata	May 18	F.J.H.J.
*C. Suffumata...	April 29	F.J.H.J.
Eubolia Plumbaria...	June 2	C.A.S.
C. Lineolata	May 14...	C.A.S.
Odezia Chærophyllata	June 1	
	PYRALIDINA.	
Hypena Proboscidalis	June 3	J.B.F.
*Herminia Barbalis	May 27...	F.J.C.B.—F.J.H.J.
Herbula Cespitalis...	May 3	F.J.H.J.
Hydrocampa Nymhæata ...	June 2	J.B.F.
Botys Verticalis	June 5	C.A.S.
B. Fuscalis	May 28...	F.J.H.J.
B. Urticata		
*Ebulea crocealis	May 6	F.J.H.J.
E. Sambucalis...	May 27...	C.A.S.
Pionea Forficalis	May 16...	T.A.P.
Scopula Olivalis	May 28...	F.J.H.J.
Simaethis Fabriciana	May 4	F.J.H.J.
Aphomia Colonella ...	bred June 11, by... ...	T.A.P.
Crambus Pratellus	May 20...	F.J.C.B.

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Name.	*Date.*	*Captor.*
Chloephora Prasinana	May 27...	F.J.H.J.
*Chimabacche fagella	Apr. 1	A.W.B. & G.C.M.
Œcophora sulphurella	May 13...	G.M.
PTEROPHORINA.		
Pterophorus Microdactylus ...	May 27...	F.J.H.J.
P. Galactodactylus	June 14, (bred) ...	F.J.H.J.
P. Pentadactylus	June 14...	G.H.D.

BOTANICAL NOTICES.

THE following list, which is unusually long this year, will show a very satisfactory amount of work done. It must be remembered that, though only a few names of observers are recorded, a very much larger number might be added of those who have not been so fortunate as their companions in bringing plants just in flower. Taking this into consideration, it may be safely stated that Botany was never more successfully cultivated at Marlborough College than during the past half-year. In consequence of the institution of Field-days, and the enrolment among our ranks of several Masters, it has been thought desirable to enlarge the area marked out in the "Flora of Marlborough." In this way a few additional plants have been added to the list.

As usual "By" indicates that a plant has been apparently in flower a day or two before being discovered, and an asterisk (*) that the specimen observed was a cultivated one.

Names of those whose initials appear in the following list:—

M. O. A.	M. O. Alison.
E. A.	E. Almack.
W. S. B.	W. S. Bambridge, Esq.
A. W. B.	A. W. Banks.
R. H. B.	R. H. Bicknell.
E. F. B.	E. F. Blosse.
H. E. B.	Rev. H. E. Booth.
R. H. B.	R. H. Bulley.
L. C. C.	L. C. Calley.
H. D.	H. Dalton.

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T. L. D. ... ... T. L. Davies.
G. H. D. ... ... G. H. Dawson.
G. W. D. L. ... ... Rev. G. W. De Lisle.
T. W. D. ... ... Rev. T. W. Dowding.
J. W. D. ... ... J. W. Dudding.
T. M. E. ... ... T. M. Edgworth.
H. A. E. ... ... H. A. Evans, Esq.
J. B. F. ... ... J. B. Fuller.
R. M. B. G. ... ... R. M. B. Glasse.
B. J. G. ... ... B. J. Guillemard.
C. F. H. ... ... C. F. Harrison.
E. L. H. ... ... E. L. Hesketh.
H. ... ... Hewson.
A. C. H. ... ... A. C. Hilton.
H. M. H. ... ... H. M. Hilton.
J. W. H. ... ... J. W. Hockin.
G. H. ... ... G. Holden.
S. I. ... ... S. Image.
F. J. H. J. ... ... F. J. H. Jenkinson.
G. A. L. ... ... G. A. Lefroy.
J. A. L. ... ... J. A. Lefroy.
H. L. ... ... H. Lopes.
W. H. M. ... ... W. H. Macdonald, Esq.
T. E. M. ... ... T. E. Maclean.
P. T. M. ... ... P. T. Macquoid.
G. C. M. ... ... G. C. Mansel.
J. W. M. ... ... J. W. Mills, Esq.
J. B. O. ... ... J. B. Oakeley.
H. E. P. ... ... H. E. Passy.
R. P. ... . R. Phayre.
J. S. P. ... ... J. S. Pratt.
E. S. P. ... ... E. S. Preston.
T. A. P. ... ... Rev. T. A. Preston.
B. W. R. ... ... B. W. Repton.
A. R. ... ... A. Reynardson.
S. A. R. ... ... S. A. Rogers.
E. E. S. ... ... E. E. Shearburn.
J. S. ... ... Rev. J. Sowerby.
S. S. ... ... S. Spencer.
H. C. S. ... ... H. C. Spry.

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F. S. ... ... F. Storr, Esq.
C. W. T. ... ... Rev. C. W. Tayler.
E. im T. ... ... E. im Thurn.
T. T. ... ... T. Tilleard.
E. J. T. ... ... E. J. Turner, Esq.
E. H. W. ... ... E H. Wayman.
G. W. W. ... ... G. W. Wootten.
W. W. ... ... W. Willimott.
P. G. Y. ... ... P. G. Young.

Thalictrum—
* majus ... ... May 26, E. im T.
flavum ... ... Meadow Rue ... ... Bud, June 2, J. S.
Anemone—
nemorosa ... ... Wood Anemone ... ... March 2, H. D.
* apennina ... Blue Anemone ... ... March 14, H. E. B.
* pulsatilla ... Pasque Flower ... ... April 22, T. A. P.
Hepatica—
* triloba ... ... Hepatica... ... ... By Feb. 13, E. im T.
Adonis—
* autumnalis ... Pheasant's Eye ... ... April 10, E. im T.
Myosurus—
minimus... ... Mouse-tail ... ... Full fl. May 19, T. A. P.
Ranunculus—
heterophyllus ... Water Crowfoot ... ... Lockeridge, Apr. 4, T. A. P.
Marlborough, Ap. 14, T. A. P.
peltatus ... ... Ditto ... ... April 10, F. S.
hederaceus ... Ivy-leaved Crowfoot ... Full fl., Pewsey, May 19, J. S.
Flammula ... Spear-wort ... ... Reading, May 19, F. J. H. J.
Ficaria ... ... Lesser Celandine ... ... Feb. 15, H. M. H.
auricomus ... Goldilocks ... ... March 29, E. S. P.
acris .. .. Upright Crowfoot ... ... April 5, J. S.
repens ... ... Creeping Crowfoot ... April 23, H. C. S.
bulbosus ... ... Buttercup ... ... April 9, E. im T.
arvensis ... ... Corn Crowfoot ... ... May 15, J. S.
Caltha—
palustris ... ... Marsh Marigold ... .. March 23, E. im T.
Trollius—
* europæus ... Globe Flower... ... ... May 5, H. E. B.

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Eranthis—		
* hyemalis ...	Winter Aconite	About Feb. 1,
Helleborus—		
viridis	Green Hellebore	March 4, M. O. A.
Aquilegia—		
vulgaris	Columbine	May 4.
Berberis—		
vulgaris	Berberry	By May 5, T. A. P.
* fascicularis ...	... ...	March 13, E. J. T.
Papaver—		
Rhœas	Common Poppy	May 19, H.
dubium	Long-headed Poppy ...	May 26, E. J. T. & F. S.
* orientale ...	... ...	June 2, E. im T.
Meconopsis—		
* cambrica ...	Yellow Poppy...	May 11, T. A. P.
Chelidonium—		
majus	Greater Celandine... ...	April 2, T. A. P.
Corydalis—		
* lutea	... ...	Full fl. May 10, J. S.
* solida	Solid Corydal	March 14, E. im T.
Fumaria—		
officinalis ...	Fumitory	May 11, F. S.
Cheiranthus—		
* Cheiri	Wallflower	April 1.
Nasturtium—		
palustre	... ...	Full fl. May 19, G. W. D. L.
sylvestre	... ...	Full fl. June 1, F. J. H. J.
officinale	Watercress	Bodwyn, May 19, T. A. P.
		Marlbro' May 27, E. im T.
Barbarea—		
vulgaris	Yellow Rocket	May 1, J. S.
Arabis—		
hirsuta	Hairy Rock-cress	March 14, E. im T.; F. S.
Cardamine—		
hirsuta	Hairy Bitter-cress... ...	Feb. 13, E. im T.
pratensis	Cuckoo-flower	March 31, E. S. P.
Sisymbrium—		
officinale	Hedge-mustard	May 15, J. S.
thalianum ...	Thale-cress	June 3, T. A. P.
Alliaria—		
officinalis... ...	Garlick Hedge-mustard	April 14, T. A. P.

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Brassica—		
campestris ..	Wild Navew	(Oare) April 4, F. S.
Lunaria—		
* biennis	Honesty	April 14, T. A. P.
Sinapis—		
arvensis	Charlock	April 2, H. M. H.
alba	... ...	fl. and seed, May 19, P.G.Y.
Draba—		
verna	Whitlow-grass	By March 14, E. J. T.
Armoracia—		
* rusticana ...	Horse-radish	(Pewsey) May 19, T. A. P.
Lepidium—		
campestre ...	Pepper-wort	April 8, E. im T.
Capsella—		
Bursa-pastoris ...	Shepherd's Purse	March 14, F. S.
Senebiera—		
coronopus	Swine's Cress	June 2, T. A. P.
Isatis—		
* tinctoria	Woad	May 3, T. A. P.
Reseda—		
lutea	Wild Mignonette	by June 10, H. M. H.
Helianthemum—		
vulgare	Rock-rose	May 9, T. A. P.
Viola—		
odorata	Sweet Violet	March 1, M. O. A.
hirta	Hairy Violet	March 15, E. im T.
sylvatica	Wood Violet	
(a) Reichenbachina	... ...	by March 30, H. M. H.
(b) Riviniana ...	... ...	March 28, H. A. E.
canina	Dog Violet	by May 17, T. A. P.
tricolor	Pansy	March 4, S. I.
(a) arvensis	Ditto	April 8, J. B. F.
* Pensylvanica ..	... ...	May 21, E. im T.
Polygala—		
vulgaris	Milkwort	April 23, H. C. S.
Dianthus—		
* cæsius	Cheddar Pink	full fl. May 23, E. im T.
Silene—		
inflata	Bladder Campion	May 20, F. S.
Lychnis—		
Flos-cuculi	Ragged Robin	May 19, G. W. D. L.

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vespertina	White Campion	May 19, E. L. H. & J. B. F.
diurna	Red Campion	April 25, E. J. T.
Githago	Corn Cockle	June 10, F. S.
Sagina—		
procumbens ...	Pearl-wort	April 4, E. im T.
Arenaria—		
trinervis	Three-nerved Sandwort	April 4, T. A. P.
serpyllifolia ...	Thyme-leaved ditto ...	March 14, F. S.
Stellaria—		
media	Chickweed	by Feb. 13, E. im T.
Holostea	Greater Stitchwort ...	April 9, J. S.
graminea	Grassy Stitchwort... ...	May 31, E. im T.
uliginosa	Bog Stitchwort	May 19, T. A. P.
Cerastium—		
glomeratum . .	Mouse-ear Chickweed ...	April 3, F. S.
*arvense	Field Chickweed	May 6, T. A. P.
Malva—		
moschata	Musk Mallow	June 21, E. im T.
sylvestris	Common Mallow	by May 31, T. A. P.
rotundifolia ...	Dwarf Mallow	May 13, F. S.
Tilia—		
*parvifolia	Lime Tree	leaf April 30
		fl. just out June 22, T. E. M.
Hypericum—		
hirsutum	Hairy St. John's Wort ...	June 19, F. S.
pulchrum	Upright St. John's Wort	June 19, F. S.
Acer—		
campestre	Field Maple	leaf April 7, T. A. P.
		fl. May 6, E. im T.
*Pseudo-platanus	Sycamore	leaf April 2, E. im T.
		fl. April 20, H. D.
Æsculus—		
*Hippocastanum	Horse Chestnut	leaf April 6, E. im T.
		fl. May 6, F. S.
*rubicunda ...	... ...	May 16, F. S.
Geranium—		
*Phæum	Dusky Crane's Bill ...	April 30, T. A. P.
*sylvaticum ...	Wood ditto	May 9, E. im T.
pratense	Meadow ditto...	May 19, E. L. H. & J. B. F.
*sanguineum ...	Bloody ditto	May 6, E. im T.
dissectum	Cut-leaved ditto	May 11, F. S.

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columbinum ...	Long-stalked ditto... ...	June 3, F. S.
rotundifolium ...	Round-leaved ditto ...	May 6, T. A. P.
molle	Dove's foot	April 9, E. im T.
lucidum	Shining Crane's Bill ...	May 4, T. A. P.
robertianum ...	Herb Robert	May 8, E. J. T.
*striatum	Pencil Geranium	May 28, E. im T.
Linum—		
catharticum ...	Purging Flax	May 16, F. S.
*montanum ...	... ...	May 24, T. A. P.
Oxalis—		
Acetosella	Wood Sorrel	March 22, T.M.E. & T.E.M.
Euonymus—		
europæus	Spindle	leaf April 4, T.A.P. fl. May 16, F.S.
Staphylea—		
*pinnata	Bladder-nut	May 3, T.A.P.
Rhamnus—		
catharticus	Buckthorn	May 25, E. im T.
Ulex—		
europæus	Furze	full March 3, E.A. & A.R.
Genista—		
tinctoria	Dyer's Green-weed ...	full fl. June 1, F.J.H.J.
anglica	Petty whin	full (Newbury) May 19, F.S.
Sarothamnus—		
scoparius	Broom	April 22, T.A.P.
Ononis—		
arvensis	Rest Harrow	June 20, F.S.
Medicago—		
lupulina	Black Medick	April 18, E. im T.
Trifolium—		
pratense	Purple Clover...	May 1, F.S.
repens	Dutch Clover	May 19, T.A.P.
minus	Lesser Hop Trefoil ...	March 14, E. im T.
* incarnatum ...	Scarlet Clover	May 16, F.S.
Lotus—		
corniculatus ...	Bird's foot	May 13, E. im T.
Anthyllis—		
vulneraria	Ladies' Fingers	May 2, F.S.
Astragalus—		
glycyphyllos ...	Milk Vetch	June 10, F.S.

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Vicia—		
hirsuta...	Hairy Tare	May 13; F.S.
tetrasperma ...	Slender Tare	May 11, F.S.
sylvatica	Wood Vetch	June 3, E. im T.
Cracca	Tufted Vetch	June 8, T. A. P.
sepium	Bush Vetch	April 14, E. im T.
sativa(angustifolia)	Common Vetch	May 13, F. S.
* faba...	Broad Bean	May 11, F. S.
Lathyrus—		
pratensis	Everlasting Tare	May 16, E. J. T.
macrorrhisus ...	Tuberous Vetch	April 13, G. C. M. & A.W. B.
Hippocrepis—		
comosa	Horse-shoe Vetch	May 13, E. J. T.
Onobrychis—		
sativa	Cock's Head	May 13, F. S.
Cytisus—		
*Laburnum... ...	Laburnum	May 8, R. P.
Prunus—		
communis		
(a) spinosa... ...	Sloe	March 29, B. W. R.
(b) insititia... ...	Bullace	leaf March 1, E. im T.
		fl. April 1, J.B.O. & S.A.R.
Avium...	Cherry Tree	leaf April 3, E. im T.
		fl. April 10, G. H. D.
Cerasus	Cherry	fl. Ap. 12, E.S.P.
*Padus	Bird-cherry	fl May 3, T.A.P.
*Lauro-cerasus ...	Laurel	Ap. 4 (Oare), F.S.
		Ap. 23 (Marlb.), T.A.P.
Spiræa—		
Ulmaria	Meadow-sweet	June 2, J.S.
*Filipendula ...	... ...	June 15, E. im T.
Sanguisorba—		
officinalis	Great Burnet	May 13, (Savernake), E.im T.
		May 19, (Marlb.) G. W. W.
Poterium—		
Sanguisorba ...	Small Burnet...	Ap. 25, E.im T.
Agrimonia—		
Eupatoria	Agrimony	May 13, F.S.
Alchemilla—		
vulgaris	Lady's Mantle...	Ap. 29, F.S.

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arvensis — ...	Paraley-piert	Ap. 4, T.A.P.
Sibbaldia—		
*procumbens ...	Sibbaldia...	by May 17, T.A.P.
Potentilla—		
anserina	Silver-weed	May 5, T.A.P.
reptans	... ...	May 19, (Pewsey) T.A.P.
Tormentilla ...	Tormentil	May 7, F.S.
fragariastrum ...	Barren Strawberry ...	Mar. 2, E.im T.
Fragaria—		
vesca	Strawberry	fl. Ap. 4, J.S. fruit, June 7, H.E.B.
elatior	Haut-boy Strawberry ...	by May 19, H.
Rubus—		
Idæus	Raspberry	May 18, T.A.P.
cæsius	Dewberry	May 16, F.S.
—?	Bramble	May 19, P.T.M.
Geum—		
urbanum	Avens	*Ap. 12; (wild) May 3, F.S.
rivale	Water Avens	*Ap. 12; (wild) May 1, F.S.
Rosa—		
micrantha	... ...	June 10, F. S.
canina	Dog Rose...	May 23, F. S.
arvensis	Trailing Dog-Rose	May 31, E. im T.
Cratægus—		
Oxyacantha ...	Hawthorn	leaf Mar. 1, E.H.W. & L.C.C. fl. May 6, P. T. M.
Pyrus—		
*aucuparia	Rowan Tree	May 3, G. W. D. L.
*Japonica	Rose Japonica...	Feb. 14, T. A. P.
apple	... ...	Ap. 16, H. E. B.
apricot...	... ...	Mar. 14, H. E. B.
almond	... ...	Ap. 5, H. E. B.
peach	... ...	Mar. 14, H. E. B.
pear	... ...	Mar. 25, J. W. D.
plum	... ...	Mar. 22. H. E. B.
Epilobium—		
montanum	Broad leaved Willow-herb	Newbury, May 19, F. S. Chiseldon, June 1,
Circæa—		
lutetiana	Enchanter's Nightshade	June 16, E. im T.

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Montia—		
fontana	Water-blinks	Mar. 21, E. im T.
Bryonia—		
dioica	Red-berried Bryony ...	May 19 (Hungerford), F. S.
Spergula—		
arvensis	Corn Spurrey...	May 15, J. S.
Sedum—		
* Rhodiola	Rose-root...	April 26.
album	White Stonecrop	June 12, E. im T.
acre	Biting Stonecrop	June 2, J. S.
		June 3, E. im T.
Ribes—		
* Grosularia ...	Gooseberry	March 15, E. im T.
* nigrum	Black Currant	leaf March 28, G. C. M.
rubrum	Red Currant	March 22, J. W. D.
* sanguineum ...	Scarlet Ribes	March 13, E. im T.
* aureum	Golden Ribes	April 2, E. im T.
Saxifraga—		
* umbrosa	... ...	May 11.
* hirsuta	... ...	May 4.
tridactylites	Rue-leaved Saxifrage ...	March 14, T. A. P.
granulata	Meadow Saxifrage	April 25, E. im T.
* oppositifolia ...	... ...	Feb. 22.
* geranifolia ...	... ...	May 3.
* cæspitosa ...	... ...	May 11.
* crassifolia ...	... ...	March 14.
Philadelphus—		
* coronarius ...	Syringa	May 23, G. H.
Sanicula—		
europæa	Sanicle	May 19, E. L. H. & J. B. F.
Ægopodium—		
Podagraria ...	Gout-weed	May 19, (Pewsey & Calne)
Bunium—		
flexuosum	Pig-nut	May 15, E. im T.
Bupleurum—		
* falcatum	Sickle-leaved Hare's-ear	nearly out June 3.
Œnanthe—		
crocata	Water Hemlock	by June 2, J. S.
Meum—		
* athamanticum	Bald Money	May 11.

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Pastinaca—		
sativa	Parsnip	May 10, F. S.
Heracleum—		
Sphondylium ...	Hog-weed	May 3, E. im T.
		May 15, F. S.
Daucus—		
Carota...	Wild Carrot	May 16, F. S.
Torilis—		
Anthriscus		June 14, F. S,
Scandix—		
Pecten-Veneris ...	Venus'-comb	May 13, Savernake, E. im T.
		May 16, (Marlboro') F. S.
Anthriscus—		
sylvestris	Cow chervil	March 11, E. im T.
		March 30, E. im T.
Chærophyllum—		
temulum	Rough Cherril...	May 16, E. im T.
Adoxa—		
Moschatellina ...	Moschatel	Feb. 27, E. im T.
Cornus—		
sanguinea	Dog-wood	leaf April 21, E. J. T.
		fl. May 27, E. im T.
*mascula	Cornel Cherry	Feb. 28, T. A. P.
Sambucus—		
nigra	Elder	leaf Feb. 25, E. im T.
		fl. May 14, F. S.
Virburnum—		
Lantana	Wayfaring Tree	leaf March 22, H. L.
		fl. April 20, F. S. & E. J. T.
opulus	Guelder Rose	leaf April 7.
		fl. May 16, E. J. T.
		fertile fl. May 21, F. S.
* Laurustinus ...	Laurustinus	April 17, E. im T.
Lonicera		
* Caprifolium		April 28, F. S.
Periclymenum ...	Honeysuckle	June 3, F. S.
xylosteum		Hungerford, May 19, F. S.
* Pyrenaica...		April 16, H. E. B.
Sherardia—		
arvensis	Blue Sherardia	May 2, E. im T.

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Asperula—		
cynanchica	Quinancy-wort	June 11, E. im T.
odorata	Sweet Woodruff	* April 15; April 28, E. im T.
Galium—		
cruciatum	Cross-wort	April 19, F. S. & E. J. T.
Aparine	Cleavers	May 9, F. S.
Mollugo	Bastard Madder	May 31, F. S.
verum	Yellow Bedstraw	June 19, F. S.
saxatile	Heath Bedstraw	cold. buds May 20, J. W. H. Chiseldon, June 1.
uliginosum	... ...	May 19, T. A. P.
Centranthus—		
* ruber	Spur Valerian	May 16, E. im T.
Valeriana—		
officinalis	Great Valerian	full June 10, F. S.
dioica	Marsh Valerian	May 2, F. S.
Valerianella—		
olitoria	Corn Salad	April 12, T. A. P.
Dipsacus—		
sylvestris	Teasel	bud June 19, F. S.
Knautia—		
arvensis	Field Knautia	May 31, J. S.
Scabiosa—		
succisa	Scabious	Chiseldon, June 1.
Columbaria... ...	Small Scabious	May 31, F. S.
Petasites—		
vulgaris	Butter-bur	Feb. 28, T. T.
Tussilago—		
farfara	Colt's-foot	Feb. 21, H. M. H. & A. C. H.
Bellis—		
perennis	Daisy	all the year.
Inula—		
* Helenium... ...	Elecampane	June 14, E. im T.
Achillea—		
* tomentosa ...	Yellow Milfoil	May 21, E. im T.
Millefolium ...	Milfoil	May 31, F. S.
Anthemis—		
arvensis	Corn Chamomile	June 3, E. im T.
Matricaria—		
inodora	Corn Feverfew	Ap. 10, (Savernake) F. S. May 9, F. S.

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Chrysanthemum—		
Leucanthemum ...	Ox-eye	May 16. F. S.
Filago—		
germanica	Cudweed...	bud June 14, F. S.
Doronicum—		
* Pardalianches...	Leopard's Bane	Ap. 26
Senecio—		
vulgaris	Groundsel	all the year
Jacobæa	Ragwort	cold. bud June 19, F. S.
campestris	Field Flea-wort	May 31, F. S.
Arctium—		
majus	Burdock	bud June 10, F. S.
Serratula—		
tinctoria	Saw-wort	by June1, (Chiseldon) W.H.M.
Centaurea—		
Scabiosa	Greater Knapweed ...	June 5, J. B. F. & S. S.
Carduus—		
nutans...	Musk Thistle	May 19, F. S.
crispus...	Welted Thistle	May 19, P. T. M.
palustris	Marsh Thistle	May 23, F. S.
acaulis...	Dwarf Thistle...	June 11, E. im T.
pratensis	... ...	June 1, B. J. G.
Lapsana—		
communis	Nipplewort	June 19, F. S.
Hypochœris—		
radicata	Cat's-ear	May 13, (Savornake) E.im T.
Apargia—		
hispida	Rough Hawkbit	May 19, (Bedwyn) T. A. P.
Tragopogon—		
minor	Goat's Beard	May 20, F. S.
Leontodon—		
Taraxacum	Dandelion	all the year; abundant Ap. 23.
Sonchus—		
asper	Sow Thistle	May 16, F. S.
arvensis	Field Sow Thistle	June 5, T. A. P.
Mulgedium—		
* alpinum	Blue Sow Thistle	June 15, E. im T.
Crepis—		
virens	Smooth Hawk's-beard ...	Ap. 24, E. im T.
Hieracium—		
Pilosella	Mouse-ear	May 16, F. S.

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* aurantiacum ...	Orange Hawkweed... ...	June 11, E. im T.
Rhododendron—		
—?		May 4, E. J. T.
Ilex—		
Aquifolium	Holly	May 13, F. S.
Ligustrum—		
*vulgare	Privet	Ramsbury June 6, F. S. Marlb. June 14, E. im. T.
Fraxinus—		
excelsior	Ash	April 5, T. A. P.
Syringa—		
*vulgaris	Lilac	May 3, G. W. D. L.
Vinca—		
minor	Lesser Periwinkle	by Feb. 25, M. O. A.
major	Greater Ditto	full bud April 9, J. W. M.
Gentiana—		
*acaulis		about April 5, H. E. B.
Menyanthes—		
trifoliata	Buck-bean	May 6, R. P. and R. H. B.
Convolvulus—		
arvensis		May 31, F. S.
Cynoglossum—		
officinale	Hounds'-tongue	May 19, H. E. P.
Borago—		
*officinalis—	Borage	May 20, P. T. M.
Symphytum—		
officinale	Comfrey	April 22, F. S. & E. J. T.
*asperrimum		May 17, E. im. T.
Echium—		
vulgare	Bugloss	June 15, E. im. T.
Pulmonaria—		
*officinalis	Lungwort	March, 6, T. A. P.
Lithospermum—		
arvense	Gromwell	April 29, T. E. M. (Ramsbury)
Myosotis—		
palustris	Forget-me-not	May 19. J. S.
arvensis	Field Scorpion-grass ...	April 4, E. J. T.
collina	Dwarf Ditto	May 1, E. im T.
versicolor	Changeable Ditto	full (Oare). May 6, F. S. & E. J. T.
Solanum—		
Dulcamara	Bitter-sweet	May 31, F. S.

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Atropa—		
*Belladonna..	Deadly Nightshade	May 21, E. im. T.
Orobanche—		
minor	Broom-rape	full fl. June 3, J. B. F. and F. J. H. J.
Lathræa—		
squamaria	Tooth-wort	by April 3, E. im T.
Verbascum—		
Thapsus	Mullein	fl.Hungerford,May19W.H.M. fl. (Marlboro) June 14, H.D. and A. W. B.
nigrum	Black Mullein	June 19, J. S.
Digitalis—		
*purpurea	Fox-glove	cold. buds, May 19, F. S.
Linaria—		
Cymbalaria... ...	Ivy-leaved Toad-flax ...	April 8, E. im T.
minor	Calf's Snout	by June 11, E. im T.
vulgaris	Common Toad-flax ...	June 10, F. S.
Scrophularia—		
nodosa...	Knotted Fig-wort	May 27, F. J. H. J.
aquatica	Water Fig-wort	June 3, J. S.
* vernalis	Yellow Fig-wort	March 18, E. im T.
Melampyrum—		
pratense	Cow-wheat	May 9, F. S.
Pedicularis—		
sylvatica	Louse-wort	April 29, F. S.
palustris	Marsh Louse-wort	not in bud June 8.
Rhinanthus		
Crista-galli	Yellow-rattle	May 15, F. J. H. J.
Euphrasia—		
officinalis	Eye-bright	June 10, F. S.
Odontites	Red Bartsia	June 13, F. S.
Veronica—		
Anagallis	Long-leaved Speedwell...	May 19, T. A. P.
Beccabunga ...	Brook lime	May 10, J. S.
Chamædrys ...	Germander Speedwell ...	April 1, E im T. April 21, E. J. T.
serpyllifolia ...	Thyme-leaved Speedwell	April 9, J. S.
arvensis	... ...	fl & seed May 19.
agrestis	Field Speedwell	fl & seed Feb. 13, E. im T.

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polita	Grey Field Speedwell ...	Feb. 12, E. H. B.
Buxbaumii		seed Feb. 13, E. im T. seed Feb. 21, A. C. H. and H. M. H.
hederifolia	Ivy-leaved Speedwell ...	Feb. 13, E. im T.
Salvia—		
* verbenaca ...	Clary	by May 28, E. im T.
Thymus—		
serpyllum	Wild Thyme	May 31, J. S.
Scutellaria—		
* scorpioides		June 22, E. im T.
Prunella—		
vulgaris	Self-heal	June 11, E. im T.
Nepeta—		
Glechoma	Ground Ivy	March 14, E. im T.
Lamium—		
amplexicaule ...	Hen-bit	by April 26, T. A. P.
purpureum	Red Dead-nettle	Feb. 13, E. im T.
album	White Dead-nettle... ...	full Feb. 20, M. O. A.; and all the year.
* maculatum ...	Spotted Dead-nettle ...	Feb. 29.
Galeobdolon ...	Archangel	April 10, J. W. M.
Betonica—		
*grandiflora		June 14, E. im. T.
Melissa—		
*grandiflora		June 2, E. im T.
Stachys—		
Betonica	Wood Betony	Chiseldon, June 1, T. A. P.
sylvatica	Hedge Woundwort ...	May 31, J. S.
Ajuga—		
reptans	Bugle	April 28, F. S.
Primula—		
vulgaris	Primrose	a few all the year.
veris	Cowslip	April 5, F. S.
Lysimachia—		
* thyrsiflora ...	Tufted loose-strife	June 20, E. im T.
nemorum	Yellow Pimpernel	May 13, J. S.
Anagallis—		
arvensis	Scarlet Pimpernel	May 19, H.

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Dodecatheon—		
* meadea	American Cowslip	April 30.
Plantago—		
lanceolata	Ribwort	April 8, F. S.
media	Lamb's-tongue	May 19, T. A. P.
major	Greater Plantain	June 3, E. im T.
Chenopodium—		
Bonus Henricus...	Good King Henry... ...	full fl. May 19, T. T.
Rumex—		
obtusifolius... ...	Broad-leaved Dock ...	May 19, T. A. P.
crispus	Curled Dock	May 16, F. S.
acetosa	Sharp Dock	by May 16, E. im T.
Acetosella	Sheep's Sorrel	April 25, F. S. & E. J. T.
Polygonum—		
Bistorta	Snake-weed	May 17, R. P.
amphibium ...	... ...	June 6, J. S.
aviculare	Knot-grass	June 11, E. im T.
Daphne—		
* Mezereum ...	Mezereum	Feb. 12.
* Laureola... ...	Spurge-laurel	by Feb. 21.
Asarum—		
* europæum ...	Asarabacca	March 14.
Buxus—		
* sempervirens ...	Box	March 14, E. im T.
Euphorbia—		
Helioscopia ...	Sun Spurge	bud March 18, E. im E.
amygdaloides ...	Wood Spurge	April 22, E, im T.
Mercurialis—		
perennis	Dog's Mercury	Feb. 26 & March 9, E. im T.
Callitriche—		
verna	Vernal Star-wort	May 21, T. A. P.
Urtica—		
urens	Roman Nettle	May 21, E.im. T.
dioica	Stinging Nettle	nearly out May 19, T. T.
Ulmus—		
suberosa	Common Elm...	May 5. full bud Feb. 16, E. im. T.
montana	Wych Elm	leaf May 20. fl. Feb. 27, *Mrs. Blake.*

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Salix—		
caprea	Sallow	leaf April 5. H. D.
		fl. Feb. 23, J. W. D.
		Feb. 28, J. A. L.
		fertile fl. March 2, E. im. T.
Populus—		
nigra	Black Poplar	full fl. March 30, E. im. T.
Betula—		
glutinosa	Birch	April 26, F. S.
Fagus—		
sylvatica	Beech	leaf May 2, G. W. D. L.
		fl. (Hungerford) May 19, F.S.
Quercus—		
Robur	Oak	leaf (full) May, 19.
		fl. May 14, J. S.
Corylus—		
Avellana	Hasel	leaf April 26.
		fl. by Feb. 13. R. P.
		Feb. 13, R. M. B. G.
Carpinus—		
Betulus	Hornbeam	leaf May 13 E. im. T.
		fl. March 27, E. im. T.
Juglans—		
regia	Walnut	by May 23, T. A. P.
Taxus—		
baccata	Yew...	full fl. Feb. 26, E. im. T.
Juniperus—		
communis	Juniper	fl. Ap. 25, F. S. and E. J. T.
Pinus—		
sylvestris	Scotch Fir	May 2, F. S.
Larix—		
*europæa	Larch	March 13, E. J. T.
Paris—		
*quadrifolia... ...	Herb Paris	by April 22, E. im. T.
Tamus—		
communis	Black Bryony	May 21, F. S.
Orchis—		
Morio	Green-winged Orchis ...	April 30, E. im T.
mascula	Early Purple Orchis ...	Aprril 21, F. S. & E, J. T.
ustulata	Dwarf Orchis	May 19, C. F. H.
maculata	Spotted Hand Orchis ...	May 20, F. S.

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latifolia	Marsh Orchis ...	...	by June 1, F. S.
pyramidalis ...	Pyramidal Orchis	...	June 3, E. im T.
incarnata	... ...	...	May 25, F. S.
Gymnadenia—			
conopsea	Fragrant Orchis...	...	June 1, G. H.
Habenaria—			
viridis	Frog Orchis ...	...	*May 21.
bifolia			full fl. June 20, F. S.
chlorantha	Butterfly Orchis...	...	May 21, J. B. F. & E. L. H.
Ophrys—			
apifera...	Bee Orchis ...	...	June 21, M. O. A.
Listera—			
ovata	Tway-blade ...	...	May 9, F. S.
Neottia—			
Nidus-avis	Bird's-nest Orchis	...	May 6, E. im T.
Epipactis—			
latifolia	Helleborine ...	...	bud June 18, F. J. H. J.
Cephalanthera—			
grandiflora	... ...	...	full fl. May 21, F. J. H. J.
Sisyrinchium—			
* anceps	... ...	...	May 28, E. im T.
Iris—			
Pseud-acorus ...	Yellow Iris ...	...	May 19, J. W. H.
Crocus—			
*	... ...	...	by Feb. 13, E. im T.
Narcissus—			
poeticus	... ...	...	* April 16, E. im T.
Pseudo-narcissus	Daffodil	...	by Feb. 26, M. O. A.
Leucojum—			
*æstivum	Summer Snowflake	...	April 8.
Galanthus—			
nivalis	Snowdrop ...	...	about Feb. 3, T. W. D.
Convallaria—			
*majalis	Lily of the Valley	...	April 27, E. im T.
Polygonatum—			
multiflorum ...	Solomon's Seal ...	...	May 2, E. im T.
Ruscus—			
aculeatus	Butcher's Broom	...	April 8, E. im T.
Tulipa—			
sylvestris	Wild Tulip ...	...	March 30, M. O. A.

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Fritillaria—		
*Meleagris	Snake's Head	March 30, E. im T.
*imperialis	Crown Imperial	April 4, E. im T.
Scilla—		
*bifolia	Twin-leaved Squill ..	March 5.
*Sibirica	Siberian Squill	by March 5.
*cernua	... ...	April 23.
Allium—		
*Schœnoprasum	Chive Garlic	by May 25.
ursinum	Ramsons—	April 30, E. im T.
Endymion—		
nutans	Blue Bell	April 5, J. S. P.
Muscari—		
*racemosum ...	Grape Hyacinth ...	March 26.
Juncus—		
effusus	Soft Rush	bud May 19.
glaucus	... ...	bud May 19.
Luzula—		
pilosa	Wood-rush	March 16, H. M. H.
campestris ...	Field-rush	April 6, E. im. T.
Alisma—		
Plantago ...	Water Plantain	June 2, T. A. P.
Arum—		
maculatum ...	Cuckoo-pint	April 10, J. W. M.
Potamogeton—		
natans ..	Floating Pondweed ...	May 19, T. A. P.
densus ...	Frogs' Lettuce ...	May 19, T. A. P.
Zannichellia—		
palustris ...		by May 21, T. A. P.
Eleocharis—		
palustris ...	... ...	May 19, T. A. P.
Scirpus—		
sylvaticus ...	... ...	bud May 19, E. E. S.
Carex—		
pulicaris ...		... seed June 10, E. im. T.
divulsa ...	Grey Sedge ...	May 3, E. im. T.
vulpina ..	Great Rough Sedge ...	May 13, F. S.
*pendula ...	Pendulous Sedge ...	by May, 5.
præcox ...	Vernal Sedge ...	by May 5, T. A. P.
glauca ...	Glaucous Sledge ...	April 25, E. J. T. and F. S.

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sylvatica	... Wood Sedge	...	April 29, E. im. T.
riparia	... River Sedge	...	April 22, E. J. T. and F. S.
hirta	... Hairy Sedge	...	by May 19, T. A. P.
ovalis	...		seed June, 1, T. A. P.
Phalaris—			
arundinacea	... Great Reed-grass	...	June 1, T. A. P.
Anthoxanthum—			
odoratum	.. Sweet Vernal grass		April 22 E. im. T.
Alopecurus—			
pratensis	... Fox-tail grass	...	April 14, E. im. T.
geniculatus	... Floating ditto	...	June 2, T. A. P.
agrestis	... Black-grass		May 13, F. S.
Milium—			
effusum	... Millet	...	May 6, E. im. T.
Holcus—			
mollis	... Soft Grass	...	April 21, T. A. P.
Aira—			
cæspitosa	... Hair Grass	...	Nearly out, June 8, T. A. P.
Trisetum—			
flavescens	... Yellow Oat-grass	...	June 1, F. S.
Avena—			
pratensis	... Narrow-leaved ditto	...	May 24, R. H. B.
pubescens	... Downy ditto	...	May 13, E. im T. & F. S.
Arrhenatherum—			
avenaceum	... Oat-grass	...	May 20, F. S.
Koeleria—			
cristata	... Crested Hair Grass	...	May 27, E. im E.
Melica—			
uniflora	... Melic	...	April 30, E. im T.
Poa—			
annua	... Annual Meadow-grass	...	March 2, E. im T.
nemoralis	... Wood ditto	...	May 15, F. S.
trivialis	... Rough ditto	...	May 13, E. im T.
pratensis	... Common ditto	...	April 23, E. im T.
Glyceria—			
fluitans	... Flote-grass		May 19, T. A. P.
plicata	...		May 1, E. im T.
Briza—			
media	... Quaking Grass	...	Bedwyn, May 19, T. A. P.
			Marlboro', May 24, R. H. B.

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Cynosurus—			
cristatus	... Dog's-tail Grass		May 25, E im T.
Dactylis—			
glomerata	... Cock's-foot Grass	...	May 13, E. im T.
Festuca—			
ovina	... Sheep's Fescue	...	Full fl. June 8.
rubra	... Creeping Fescue	...	May 13, E. im T.
sciuroides	...		Bud June 2, T. A. P.
Bromus—			
erectus	... Upright Brome-grass	...	May 19.
asper	... Hairy ditto	...	June 16, E im T.
sterilis	... Barren ditto	...	May 13, F.S.
Serrafalcus—			
racemosus	... Field ditto	...	May 25, T. A. P.
commutatus	... Lop-grass	...	By May 25, T. A. P.
mollis	... ...	...	April 22, E im T.
Triticum—			
caninum	... Rye Grass	...	Nearly out, June 14, E. im T.
Lolium—			
perenne	...		May 4, E. im T.
Barley, ear	...		June 18, T. L. D. & E. F. B.
Rye, ear	...		May 10, G. W. D. L.
Wheat, fl.	...		June 9, G. W. D. L.
Equisetum—			
arvense	... Corn Horsetail	...	fertile, April 10, F. S.
			barren April 28, G. A. L.
limosum	... Smooth ditto	...	May 13, J. S.
palustre	... Marsh ditto		May 13, F. S.
Botrychium—			
Lunaria	Moonwort		May 1, G. H.
Ophioglossum—			
vulgatum	Adder's Tongue		May 2, P. T. M.

NEW LOCALITIES.

Myosurus minimus	Near Pewsey, T. A. P.
Ranunculus peltatus	Huish, J. S.; Pewsey, J. S.
Ranunculus hederaceus ...	Pewsey, J. S.; Reading, F. J. H. J.
Ranunculus Flammula ...	Fox Wood, T.A.P.; Swindon Reservoir, E.im T. near Ramsbury, E.im T.; Reading, F.J.H.J.
Aquilegia vulgaris	Wan's Dyke, P. T. M.
Viola canina	Marlborough Common, T. A. P.

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Stellaria uliginosa	Mildenhall, T. A. P.
Malva rotundifolia	Overton, J. S.
Genista tinctoria	Chiseldon, F. J. H. J.
Lotus major	Marsh near Ramsbury, T. A. P.
Vicia sylvatica	West Woods, T. A. P.; Martinsell, E. im T. Bignall, F. S.
Fragaria elatior...	Near Martinsell, H.
Rosa micrantha	Half-way between Marlborough and Bignall, F. S.; Oare, F. S.
Spergula arvensis	Chiseldon, E. im T.
Senecio campestris	Rabley Down and Bath Road, F. S.
Serratula tinctoria	Chiseldon, W. H. M.
Lathræa Squamaria	Ramsbury, T. A. P.; Savernake, W. W.; West Woods, E. im T.; Littlecote, J S.
Verbascum nigrum	Overton, J. S.
Polygonum Bistorta	Near Clench Common, C. W. T.
Daphne Laureola	Ramsbury, T. A. P.
Orchis Latifolia	Mildenhall, F. S.; Lockeridge, J. S.; Martinsell, E. im T.; Stitchcomb, J. S.
Habenaria viridis	Oare, F. S.
Habenaria bifolia	Mildenhall, F. S.
Ophrys apifera	White Horse Down, M. O. A.
Carex hirta	Bedwyn, T. A. P.
Ophioglossum vulgatum ...	Near the Wan's Dyke by the Railway, W. S. B.

NEW SPECIES.

Nasturtium palustre	Great Bedwyn, G.W.D.L.; Lockeridge, T.A.P.
Nasturtium sylvestre ...	Swindon Reservoir, F. J. H. J.
Astragalus Glycyphyllos ...	Bignall, F. S.
Galium uliginosum	Chiseldon, T. A. P.
Linaria minor	
Carduus pratensis	Chiseldon, B. J. G.
Paris quadrifolia...	Ramsbury, E. im T.
Orchis incarnata...	Mildenhall, F. S.; near Ramsbury, F. S.; Lockeridge, J. S.
Epipactis latifolia	Savernake Forest, F. J. H. J.
Scirpus sylvaticus	Calne, E. E. S.
Carex ovalis	Swindon Reservoir, E. im T.; near Ramsbury, T. A. P.
Festuca sciuroides	Lockeridge, T. A. P.

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ORNITHOLOGY.

THE following are the names of those who occur in the following list:—

F.F.B. ... ... F. F. Back.
G.H.B. ... ... G. H. Baily.
F.B. ... . F. Borlase.
G.W.C. ... ... G. W. Creaton.
J.B.F. ... ... J. B. Fuller.
R.M.B.G. ... ... R. M. B. Glasse.
J.W.H. ... ... J. W. Harvey.
G.H. ... ... G. Holden.
R.A.I. ... ... R. A. Illingworth.
F.J.H.J. ... ... F. J. H. Jenkinson.
G.K. ... ... G. Knubley.
J.H.L. ... . J. H. Lambert.
C.E.L. ... ... C. E. Lawson.
P.M. ... ... P. Macquoid.
J.B.O. ... ... J. B. Oakeley.
G.O. ... ... G. Owen.
R.P. ... ... R. Phayre.
S.A.R. ... ... S. A. Rogers,
H.S. ... ... H. Simpson.
C.A.S. ... ... C. A. Sladen.
H.C.S. ... ... H. C. Spry.
E. im T. ... ... E. im Thurn.
T.T. ... ... T. Tilleard.
F.F.W. ... ... F. F. White.

Kestrel (Falco tinnunculus)—egg May 8th, S. A. R.
Sparrow Hawk (Falco nisus) egg May 9th, E. im T.
Barn Owl (Strix flammea) young birds, observed by E. im T, April 22nd.
Tawney Owl (Strix aluco) young birds taken by — Fenwick, April 29th.
Spotted Flycatcher (Muscicapa grisecla)—young birds, May 30th, E. im T.
Missel Thrush (Turdus viscivorus)—egg March 16th, S. A. R.
Fieldfare (Turdus pilaris)—seen April 18th, F. J. H. J.
Song Trush (Turdus musicus)—egg March 13th, G. H.
Blackbird (Turdus merula)—egg March 22nd, S. A. R.

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Ring Ouzel (Turdus torquatus)—seen April 17th, E. im T.; egg May 4th, T. T.
Hedge Sparrow (Accentor modularis)—egg, F. B.—H. S.
Redbreast (Sylvia rubicula)—5 eggs March 29th, R. P.
Redstart (Sylvia phœnicurus)—seen April 13th, E. im T.; egg May 4th, J. B. F.
Stone-chat (Sylvia rubicola)—seen April 7th, E. im T., egg May 14th, G. O.
Wheat-ear (Sylvia œnanthe)—seen March 28th, E. im T.
Sedge Warbler (Sylvia phragmitis)—egg April 25th.
Reed-wren (Sylvia arundinacea)—egg May 15th, E. im T.
Black-cap (Sylvia atricapilla)—seen April 22nd, E. im T., egg May 8th, C.E.L.
Whitethroat (Sylvia cinerea)—seen May 5th, F. J. H. J.—egg May 19th, J.B.O.
Wood-wren (Sylvia sibilatrix)—seen May 6th, F. J. H. J.—egg May 18th, E. im T.
Willow-wren (Sylvia trochilus)—seen April 21st, E. im T.—egg may 4th, E. im T.
Chiff-chaff (Sylvia rufa)—seen March 29th, E. im T.
Great Tit (Parus major)—egg April 16th, H. C. S. and R. M. B. G.
Blue Tit (Parus cæruleus)—egg April 13th, E. im T.
Cole Tit (Parus ater)—egg May 30th, F. J. H. J.
Long-tailed Tit (Parus caudatus)—egg April 19th, H. C. S.
Pied Wagtail (Motacilla Yarrellii)—egg May 10th, T. T.
Meadow Pipit (Anthus pratensis)—egg May 11th, E. im T.
Sky Lark (Alauda arvensis)—egg April 30th, S. A. R.
Yellow-hammer (Emberiza citrinella)—egg April 15th, E. im T.
Chaffinch (Fringilla cœlebs)—egg April 26th, F. F. W.
House Sparrow (Fringilla domestica)—egg April 30th, F. F. B.
Greenfinch (Fringilla coccothraustes)—egg May 8th, G. W. C.
Goldfinch (Fringilla carduelis)—egg May 21st, S. A. R.
Linnet (Fringilla cannabina)—egg May 8th, J. B. O.
Starling (Sturnus vulgaris)—egg April 18th, C. A. S.
Rook (Corvus frugilegus)—egg March 17th, T. T.—R. A. I.
Jackdaw (Corvus monedula)—egg April 13th, J. H. L.
Magpie (Corvus pica)—egg April 18th, F. B.
Green Woodpecker (Picus viridis)—egg May 18th, E im T.
Spotted Woodpecker (Picus major)—obtained May 28th, E. im T.
Creeper (Certhia familiaris)—egg May 4th, G. K.
Wren (Troglodytes europæus)—egg May 1st, E. im T.
Cuckoo (Cuculus canorus)—seen April 8th, G. H. B.; egg May 8th, P. M.
Swallow (Hirundo rustica)—seen April 3rd, J. W. H.; egg May 15th, T. T.
Martin (Hirundo urbica)—seen April 21st, E. im T.

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Sand Martin (Hirundo riparia)—seen April 8th, S. A. R.
Swift (Cypselus apus)—seen April 22nd, E. im T.
Stock Dove (Columba œnas)—egg March 21st, T. T.
Turtle Dove (Columba Turtur)—seen May 30th, E. im T.
Pheasant (Phasianus colchicus)—egg May 5th, E. im T.
Partridge (Perdix cinerea)—egg May 2nd, G. K.
Quail (Coturnix vulgaris)—seen April 21st, E. im T. Seven eggs, June 22, T. T.
Stone Curlew (œdicnemus crepitans)—seen April 15th, E. im T.; egg May 19th, G. H.
Lapwing (Vanellus cristatus)—egg March 28th, S. A. R. & J. B. O.
Common Sandpiper (Totanus hypoleucus)—seen April 20th, E. im T.
Land-rail (Gallinula crex)—seen April 22nd, E. im T.; egg May 20th, T. T.
Moorhen (Gallinula chloropus)—egg April 4th, E. im T.
Coot (Fulica atra)—seen plentifully at Swindon Reservoir, June 1st, E. im T.
Little Grebe (Podiceps minor)—egg April 11th, T. T.
Common Gull (Larus canus)—seen April 20th, E. im T.

The following donations have been made to the Ornithological Collection during the half:—

Specimens of the

1 Sparrow Hawk (Falco nisus)—by M. H. Smith.
1 Short-eared Owl (Strix brachyotus)—by Mr. Nichols.
1 Pied Flycatcher (Muscicapa atricapilla)—by ditto.
1 Song Thrush (Turdus musicus)—by ditto.
1 Golden-crested Wren (Regulus cristatus)—by J. B. Oakeley.
1 Meadow Pipit (Anthus pratensis)—by Mr. Nichols.
1 Yellow hammer (Emberiza citrinella)—by ditto.
1 Green Woodpecker (Picus viridis)—by ditto.
2 Spotted Woodpecker (Picus major)—by the Rev. T. A. Preston.
1 Swallow (Hirundo rustica)—by Mr. Nichols.
1 Martin (Hirundo urbica)—by ditto.
1 Swift (Cypselus apus)—by ditto.
3 Quail (Coturnix vulgaris)—by E. im Thurn.
1 Heron (Ardea cinerea) by M. H. Smith.
1 Snipe (Scolopax gallinago)—by Mr. Nichols.
1 Common Sandpiper (Totanus hypoleucus)—by Mr. Nichols.

Eggs of the following have been presented to the Society by H. C. Mercer, Esq.:—

Kestrel, Sparrowhawk, Red-backed Shrike, Pied Flycatcher, Song Thrush, Redstart, Stonechat, Whinchat, Wheatear, Sedge Warbler, Reed-wren (2),

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Nightingale (2), Blackcap, Whitethroat, Willow-wren (2), Golden-crested Wren (9), Great Tit, Blue Tit, Pied Wagtail (2), Meadow Pipit, Skylark (3), House-sparrow (5), Greenfinch, Goldfinch (2), Linnet, Bullfinch (3), Rook (3), Jackdaw (5), Jay (2), Creeper (2), Wren, Swallow, Martin (3), Sand Martin (2), Swift, Nightjar (2), Turtle Dove, Lapwing (7), Sanderling, Common Sandpiper, Norfolk Plover, Dunlin, Moorhen (2), Dabchick (2), Red-throated Diver.

A model of a Great Auk's egg in the collection of Professor Newton has been presented by Mr. Baker, of Cambridge; and an egg of the White-tailed Eagle by C. E. Lawson.

A collection of Nests has also been started, and consists at present of about 40 specimens, the principal of which are:—

Red-backed Shrike	—presented by	E. im Thurn.
Missel Thrush	,,	,,
Song Thrush	,,	,,
Blackbird	,,	,,
Hedge-sparrow	,,	,,
Stone-chat	,,	,,
Whinchat	,,	,,
Wheatear	,,	,,
Grasshopper Warbler (?)	,,	C. A. Sladen.
Willow Wren	,,	E. im Thurn.
Golden-crested Wren (2)	,,	,,
Greater Titmouse	,,	,,
Long-tailed Titmouse	,,	H. C. Spry.
Pied Wagtail	,,	R. Phayre.
Meadow Pipit	,,	E. im Thurn.
Black-headed Bunting	,,	,,
Yellow-hammer	,,	,,
Chaffinch	,,	,,
Hawfinch	,,	Rev. J. S. Thomas.
Wren	,,	E. im Thurn.
Swallow	,,	C. M. Bull, Esq.

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COLLECTION OF COINS.

SILVER COINS.

Groat of Edward I.—Mr. C. Brampton.

Ditto of Richard II.

Henry IV.
Edward VI.
Henry VIII.
Elizabeth
} by G. G. Monck.

James I.—by A. D. Nind.

Elizabeth—by E. C. Sewell.

Charles II., sixpence—by A. D. Nind.

Ditto, shilling—by J. C. Brown.

William and Mary, sixpence—by A. D. Nind.

Anne, shilling—by G. C. Brown.

George II., sixpence—by ditto.

Ditto, shilling and two shillings—by Freeman.

George III., two shillings—by E. C. Sewell.

Victoria, penny, three-half-pence, and twopence, by C. Irwin

COPPER COINS.

Charles I., half-penny.

William and Mary, penny—J. C. Brown.

Ditto, half-penny—A. D. Nind.

George II., farthing and penny, by ditto.

George III., 2d., by H. S. Dickinson.

Ditto, half-penny and farthing—by Churchill.

Ditto, penny and half-penny—by G. A. W. Tate.

George IV., farthing, halfpenny, and a penny—by ditto.

William IV., farthing, halfpenny, and a penny—by ditto.

ROMAN COINS, By J. C. Brown.

Silver denarius of Antonius Pius

Copper coin of ditto.

Ditto of Faustina.

Ditto of Commodus

And seven of which the inscriptions are unintelligible.

Coin of Constantius by A. D. Nind.

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ACCOUNTS.

Receipts.	£	s.	d.	Expenditure.	£	s.	d.
Balance from last Half-year	3	8	10	Carriage of Minerals ...	0	2	0
Subscriptions	6	1	0	Paid Mr. Hillier	6	16	0
Donations	9	8	6	Candles	0	3	6
Sale of Report, Xmas, 1867	15	2	0	Gum	0	0	6
Sale of back Reports ...	1	0	0	Mr. Hillier	10	19	0
				Mr. Perkins	12	2	6
				Book Account	3	12	0
				Balance in hand.	1	4	10
	£35	0	4		£35	0	4

LIST OF DONATIONS.

	£	s.	d.
F. J. H. Jenkinson	0	1	6
G. H. Dawson	0	2	6
H. M. Hilton	0	2	6
C. E. G. Crawford	0	2	6
E. B. Henderson	0	2	6
A. Armstrong, Esq.	0	2	6
C. Hodgson, Esq., ...	1	0	0
Mrs. Norris, Epsom	1	1	0
Rev. J. S. Thomas	0	2	0
Miss Corrie	1	0	0
Sir M. Smith	1	0	0
P. P. Smith, Esq.	0	10	0
Rev. H. Bell	0	7	6
F. Storr, Esq.	0	17	6
R. F. Isaacson, Esq.	0	2	6
J. W. Mills, Esq.	1	10	6
A. C. Almack, Esq.	0	10	6
W. W. Dayman, Esq.	0	10	6
T. R. Dumergue, Esq.	0	2	0
Smaller	0	0	6
	9	8	6

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ADDITIONS TO THE LIBRARY.

Vols.		Donor.
1.	Birds of Bucks and Berks...	H. R. H. Prince Leopold.
1.	Ditto	Rev. R. Duckworth.
2.	Stainton's Manual of British Butterflies and Moths ...	Rev. H. Bell.
2.	Humphrey's Coin Collector's Manual	G. G. Monck.
1.	Bate's Naturalist on the Amazons	G. H. Dawson.
1.	Stainton's British Butterflies and Moths 1. Rye's British Beetles 1. Shuckard's British Bees 1. Pluc's British Ferns	...	A. C. Almack, Esq. W. W. Dayman, Esq. J. W. Mills, Esq.
1.	Wood's Geology for the Million	F. S. Strickland.
2.	Darwin's Animals and Plants under Domestication ...	Miss E. Corrie.
	Various papers on Natural History Subjects	Rev. A. C. Smith.
	Report of the Rugby School N. H. Society	The Society.
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	The "Ibis" The "Entomologist" The "Entomologist's Monthly Magazine" } For the Half Year	Rev. T. A. Preston.
	The "Zoologist" The "Zoological Magazine" } for the Half Year	Purchased.

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PRIZE ESSAY ON PIGEONS, BY G. E. MANISTY.

1.—First, as to the Pigeon itself. It is hardly necessary for me to state that there are many different kinds of pigeons, totally differing from each other, as for instance the Carrier, whose rapid flight seems almost fabulous, and on the other hand the Fantail, a very poor flier indeed, and of quite a different appearance from the Carrier. The Tumbler is one of the prettiest, and in my opinion the most amusing species of all, and it is of Tumblers that I shall speak.

2.—Then as to the *nature* of the Pigeon. They are very *hot*-natured birds, so to speak, and when it is raining you may constantly see them lying first on one side with one wing raised to let the rain fall under it and cool it, and then doing the same on the other. They are also very fond of a bathe, and will dip themselves into the muddiest water rather than have no bathe at all. *Salt* is very much to their taste, and it is generally believed that they will not leave a pigeon house while there is a lump of rock salt or indeed any salt in it. Pigeons, as it is pretty well known, have a very strong attachment to the place where they were born and reared. This is especially seen in Carriers, which will fly enormous distances to return to their old house. Tumblers, however, and other kinds soon get reconciled to a new abode, provided they are pretty happy there, that is to say if they have 'husbands' or 'wives' as the case may be, and other bird-like comforts. Pigeons of *every* species, I think I may say, have most ravenous appetites, and the Woodpigeon is (I believe truly) said to eat twice its own weight of food every day. Whenever I have shot Woodpigeons towards evening I have always found their crops as full as possible, even uncomfortably so, I should have imagined. An instance of this greediness in tame pigeons occurred once among my own set or 'kit' as it is generally called. I one day accidentally left the corn box open for a short time, when one of my pigeons hopped in without my noticing it, and was so intent on his food that he did not attempt to get out when the lid was shut down. I missed this pigeon the whole of the day and was beginning to think it must have strayed away or been captured, when on going to the box in the evening I there discovered the wretched bird looking a most piteous object. It had evidently been eating as fast as it possibly could until it was unable to eat any more; its crop was very much swollen out with corn, and it actually could not hold up its head, from the weight of the food it had stowed away. I thought at first that it would die, but the next morning it seemed almost recovered and ready for a repetition of the meal.

3.—*Habits*—Under this head I intend to include nearly all that I have to say. In order to explain how it was that I studied the habits of pigeons so closely, I must mention that I used to keep them in a double loft, and used to remain quiet in one while the pigeons were in the other.

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Almost the first thing that I noticed on beginning to keep pigeons was the manner in which they at once get accustomed to any object; for instance, I brought a pair of Pigeons rather late one night into the loft, and put them on a beam to roost for the night. The next night I saw them at roost again in just the same place, which they occupied regularly ever afterwards. Again, if I put a little straw into a nest and put a pair of pigeons into it they would oftener than not keep to that nest. I once watched a very interesting fight for a nest. Two birds had had it for some time, and no doubt thought they were quite safe in their abode, when one day, for some reason or other, another pair took a fancy to the same nest. The male intruder flew up to the nest and tried to take quiet possession, but the old inhabitant of the same sex did not seem quite so willing to give it up, and a stand-up fight ensued. Perhaps it would be as well just to say a few words in passing on the manner of fighting among pigeons. They of course use their beaks, as we should naturally expect; but that is not all, for they also use their wings. Indeed I think the wing is by far the more formidable member, as the beak is not strong in Pigeons as it is in Jackdaws, &c., while the wing is very powerful, to enable the bird to fly with the speed and endurance for which it is remarkable. But to return to where we left the combatants, they first began fighting in the small box where the disputed nest was, but not finding room to exert their full strength, I suppose, they adjourned to a convenient broad ledge and there pecked and struck out with their wings to their heart's content. I watched them until they were so tired that they were both forced to retire from the lists for breathing time. I then left them, but in the afternoon I again went to see what they had decided about the nest, and lo! they were hard at it again. The contest was decided that evening, and the old inhabitants were turned out. Pigeons, like other "gentle doves," are by no means so gentle as is generally supposed, but, on the contrary, fighting is rather a favourite amusement with them, and some of them carry the science to a high pitch of perfection. Though Pigeons are so quarrelsome with one another, they certainly are gentle to men, and often become very much attached to a person who feeds them and treats them kindly. I had mine very tame for some time, and if I held out my hand and whistled they would immediately fly down and settle on me and begin hunting about for something to eat. Sometimes I used to put a pea between my lips, and they would peck at it in a most indefatigable manner, until I let them have it. One great favourite that I had used frequently to drink out of a wine-glass, sitting on my hand.

It is very amusing to place a looking-glass where the Pigeons can get at it, for either from conceit or some other cause, they strut about before it, and coo and spread their tails out in a ludicrous manner; and every now and then they go to look for the imaginary pigeon, their own likeness, behind the glass where of course they see nothing and return to re-assure themselves that

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there was really something before, which they were cooing at. I think for my own part that it is rather a fallacy to suppose, as is sometimes done, that a glass has the power of attracting stray pigeons, and of making your own pigeons stay at home, instead of wandering away as they are occasionally apt to do.

The most interesting time to watch the habits of Pigeons is when they are breeding, to see them building their nests, hatching their eggs, and feeding their young, all in the most systematic, regular, manner.

The nest is not an object of much care to them, and they will sometimes lay their eggs on the bare floor or wherever the nest should be. When they do build one, they make it of straw, and one sits inside arranging the straws one by one as the other supplies them. When the nest is completed they are not long before they make use of it. I noticed that they *always* laid the first egg somewhere about 4 o'clock in the afternoon, and then after missing a day they would lay the second between 1 and 2 o'clock in the day time, two days after the first. This rule was never once broken while I kept pigeons, which is one instance of the regularity I mentioned. Almost directly after the second egg (for they never have more than two, at least I never saw one with more) they begin the operation of sitting, the most troublesome of all I should say, or rather perhaps the most trying, as they have to be sitting constantly on the eggs for about three weeks, *i.e.* to say from 19 to 21 days. They are never less than 19, but sometimes they are one, or perhaps two days over the 21, before they hatch. Here again they shew their systematic nature, for when the eggs have been hatched they carefully put one half of the shell inside the other and generally throw them out of the nest. If ever you have seen eggs broken for cooking purposes, I have no doubt you will have noticed the cook treat the shells just as pigeons do. Sometimes one egg is hatched a day or so before the other, and very often either one or both of them become addled. The reason for this, I imagine, is in some cases that mice get into the nest and disturb the birds when sitting, but no doubt there are other causes as well. Some pigeons in fact do not seem to like the trouble of sitting on their eggs, and leave them until they get cold and become addled. Others again go to just the opposite extreme, and like to be sitting always. I had a pair which never had any eggs, but were for all that very fond of building nests and sitting by the week together on imaginary eggs. I thought it would be rather a good thing to give them something to take care of, and so I put a Wood-pigeon's egg in their nest. They seemed highly pleased with the acquisition, began at once to sit, and hatched it in due time. The young pigeon was growing very fast and had attained a considerable size, when one day I discovered the wretched creature on the floor smashed flat. I believe some one must have trodden on it accidentally. I was rather disappointed, as I had wished to try and keep the wild pigeon with my tames ones, and see if he would become domesticated.

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Rather an interesting fact, in my opinion, is, that while a pair of Pigeons are sitting, the male bird always stays on the eggs during the day-time, and the female through the night, from about 5 in the afternoon. By this arrangement the 'paterfamilias' certainly has the hardest work, as it must be rather trying to stay in all day when you might be out and enjoying yourself. His partner, on the other hand, merely has to sleep in the nest instead of on a beam or elsewhere, and is at liberty all day. Of course the old gentleman has about 5 minutes or so for his dinner, but that is all. Young Pigeons grow wonderfully fast when they have been out of the shell a day or two, and in about three weeks they begin to move about and just fly short distances. But their powers of getting food for themselves do not come on so fast, for they can fly pretty well a considerable time before they can feed themselves. While they are in the nest both the old birds feed them alike, and not as sparrows and other birds do, by bringing them a beak-full at a time, but they produce it from their crops, and make a very peculiar noise in the performance. When the young ones are out of the nest, they are constantly troubling their parents to feed them, and while being fed flutter their wings, and seem just as if they were coaxing or thanking the old birds, as with one of their wings they keep patting them on the back.

As soon as they have reared one pair of young ones, even before they have left them to get their own food, the old Pigeons again lay, (in the same nest), sit, hatch, and go through the same course as I have described, and this they do through more than half the year, so that they have several families at the end of the season, and sometimes children's children.

The reason for keeping 'Tumblers' in preference to other kinds of Pigeons is, of course, the pleasure of watching them. When the young ones can fly pretty well then is the best time for getting them all into training, as they seem to enjoy exercise then, but as they grow older, unless kept up to the mark by being flown regularly every day, they relapse into lazy habits. They look very pretty when they fly well together, and keep tumbling over and over, especially if they are up high in the air. The young ones do not attempt to tumble until they can fly as well as the old ones, and they practise by themselves frequently. I saw a pigeon once, it was not my own, that used to thow himself over and over so many times and so fast that he could not always stop himself, and one day he suddenly found himself on the ground, when he no doubt thought he was high up in the air. He hurt himself rather, and lost a considerable amount of feathers by his fall. That was the only instance that I ever saw of a Pigeon not being able to stop while tumbling, for most of them do it with the greatest ease, apparently. Tumblers should never be mixed with other pigeons, as they try and keep up with them when flying, and to enable them to do this they must stop tumbling almost altogether.

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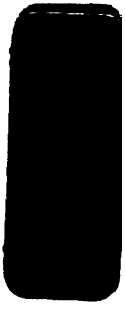
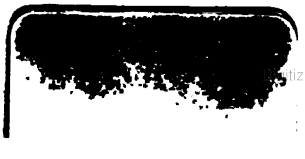
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